KING COUNTY CONVEYANCE SYSTEM IMPROVEMENT PROJECT

NORTH LAKE WASHINGTON PLANNING AREA

TASK 220 REPORT

EXISTING FACILITIES REVIEW

JANUARY 2004

HDR

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

INTRODUCTION

The King County Wastewater Treatment Division North Lake Washington Planning Area covers the sixteen service basins in King and Snohomish Counties that are upstream of the Kenmore Interceptor Section 2 ("Kenmore Lakeline") and the York and Hollywood Pump Stations. Besides King County, eleven local sewer districts operate and maintain conveyance lines and pump stations in this area.

The purpose of this report is to review the existing King County and local wastewater facilities in the planning area.

EXISTING KING COUNTY FACILITIES

The following King County facilities are in North Lake Washington Planning Area:

- Lake Ballinger McAleer Trunk
- McAleer Trunk,
- Lyon Creek Interceptor,
- McAleer/Lyon Trunk,
- Swamp Creek Trunk,
- Inglewood Trunk,
- North Creek Interceptor,
- Lower Bear Creek Trunk,
- Bothell-Woodinville Interceptor,
- Kenmore Interceptor Section 5,
- Kenmore Interceptor Section 3,
- Logboom Storage Facility,
- North Creek Storage Facility,
- Lake Ballinger Pump Station,

- Logboom Regulator Station,
- North Creek Pump Station,
- Woodinville Pump Station, and
- Kenmore Pump Station.

Figure 220-1 shows County facilities, as well as some of the facilities owned by local purveyors in the planning area.

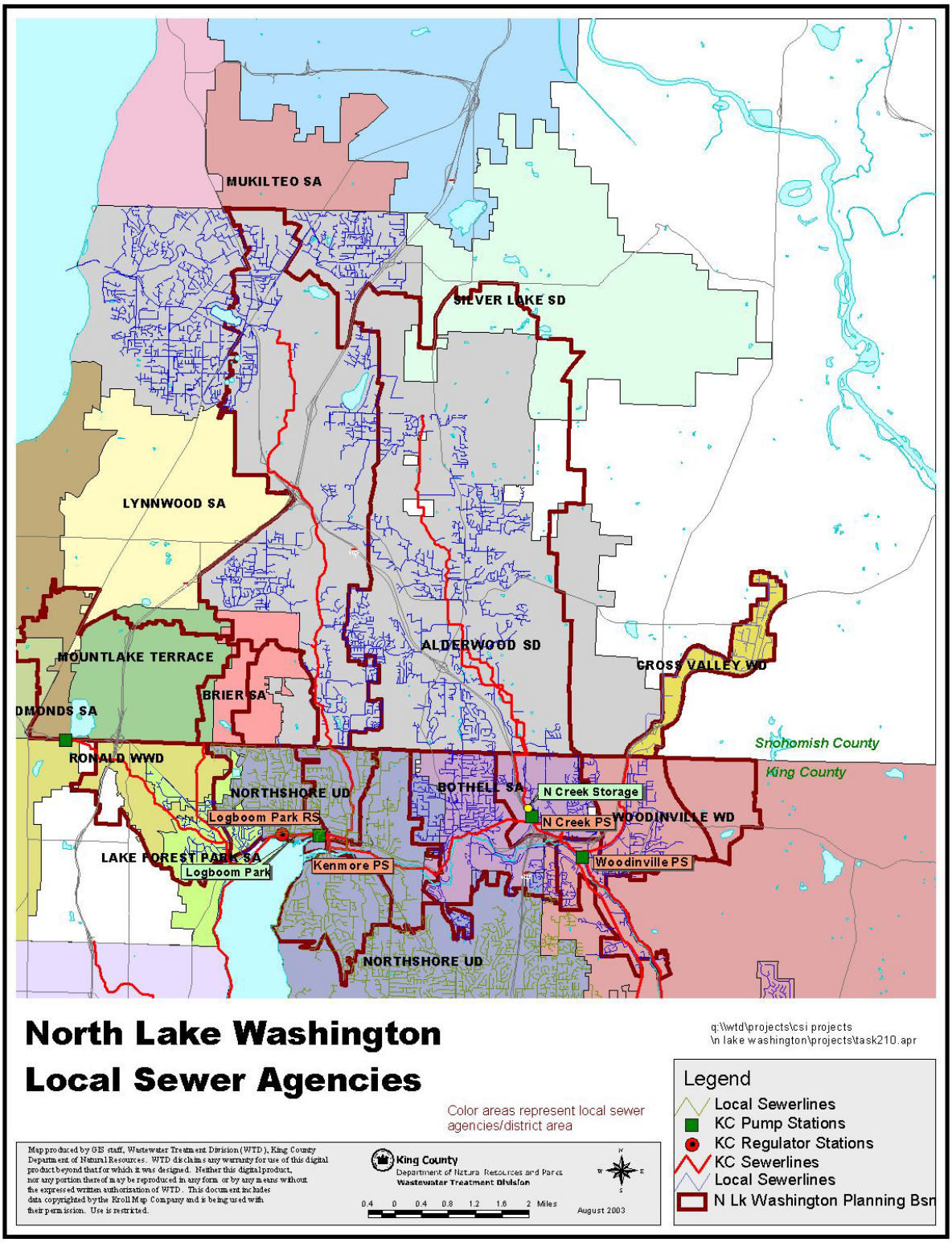

Figure 220-1. North Lake Washington Conveyance Systems and Local Agencies

LAKE BALLINGER MCALEER TRUNK

The Lake Ballinger McAleer Trunk is 10,732 lineal feet (LF) long and is 24 to 36 inches in diameter. The trunk starts at the Lake Ballinger McAleer Forcemain Transition Structure at Manhole (MH) 52 and extends southwest to MH GR14, where the trunk connects the upper reach of the McAleer Trunk. Lake Ballinger – Snohomish Service Basin flows from the Lake Ballinger Pump Station as well as local flows in the McAleer & Lyon Service Basin are conveyed in this trunk.

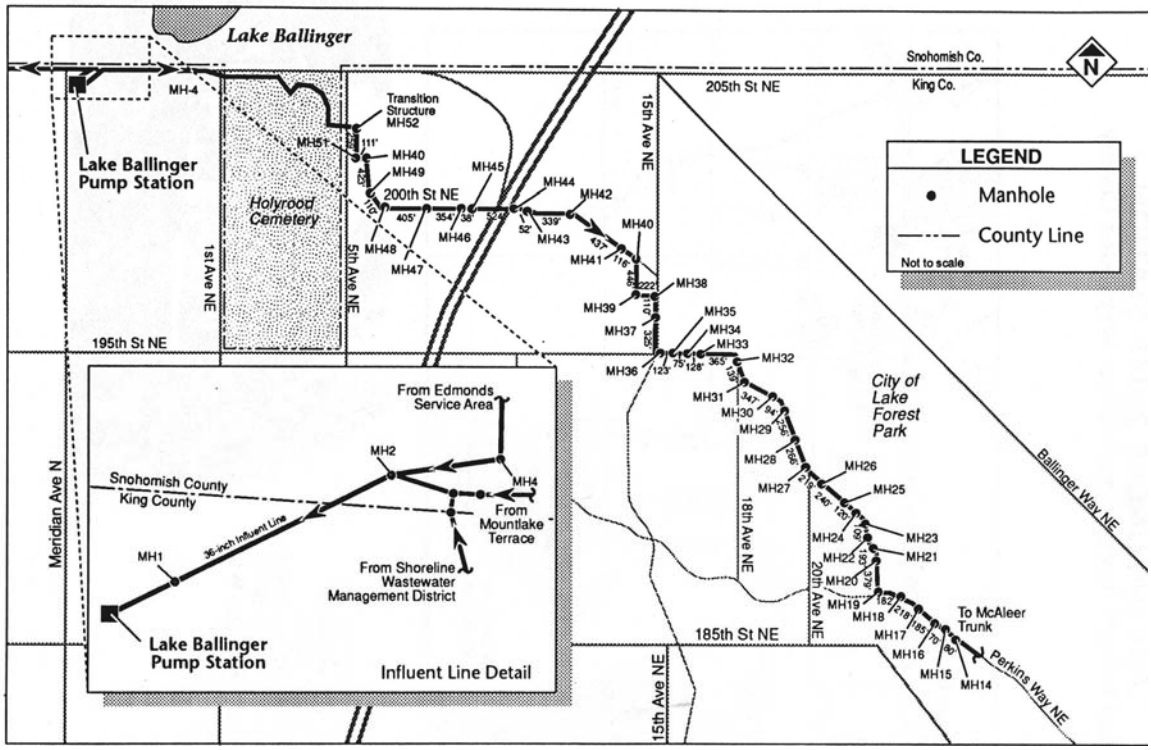

Figure 220-2. Lake Ballinger Pump Station and Lake Ballinger McAleer Trunk

MCALEER TRUNK

The uppermost reach of the McAleer Trunk, where the Lake Ballinger McAleer Trunk terminates, is 10 inches in diameter for 15 LF and increases to 21 to 24 inches for the rest of the pipeline. The McAleer Trunk is a total of 6,132 LF long and conveys flows from both the Lake Ballinger McAleer Trunk and local flows from the McAleer & Lyon Service Basin. Figure 220-3 is one-line diagram of this trunk. The trunk terminates into McAleer/Lyon Trunk at MH W502-12. The trunk has a capacity of 11.7 to 19.8 mgd.

LYON CREEK INTERCEPTOR

The Lyon Creek Interceptor starts at MH-23 at the King/Snohomish County Line and extends south to MH W502-12 (the start of the McAleer/Lyon Trunk). The 8,999 LF-long interceptor is 12 to 24 inches in diameter with a capacity of 3.2 to 36.2 mgd. Flows from the Lyon Service Basin enter the interceptor at MH-23 with additional flows from the McAleer and Lyon Service Basin entering at various manholes along the interceptor. Figure 220-3 shows this interceptor.

MCALEER/LYON TRUNK

The McAleer/Lyon Trunk starts the connection of the McAleer Trunk with the Lyon Creek Interceptor at MH 502-12 and terminates at the Kenmore Interceptor Section 2 (Kenmore Lakeline) at MH W11-35 in Lake Washington. This trunk is indicated on Figure 220-3. The trunk is 3,308 LF long, of which approximately 270 LF is in Lake Washington. The McAleer/Lyon Trunk conveys local flows in the McAleer & Lyon Service Basin as well as flows from the McAleer Trunk and Lyon Creek Interceptor. This trunk has a capacity of 11.7 to 38.5 mgd.

SWAMP CREEK TRUNK

The 50,452 LF-long Swamp Creek Trunk conveys flows from the Northshore Utility District (Northshore) in the Swamp Creek – King Service Basin and wastewater from the Alderwood Water & Wastewater District (Alderwood) in the Swamp Creek – Snohomish Service Basin to the Kenmore Interceptor Section 5. The trunk starts at MH SW35A008, on Manor Way approximately 1,100 feet north of 148th St. SW in Snohomish County and extends south to MH W11-53 of the Kenmore Interceptor Section 5 at the intersection of 73rd Avenue NE and NE 175th Street. The trunk is 24 to 36 inches in diameter in Snohomish County and 36 inches in diameter in King County. The Snohomish County section of the Swamp Creek Trunk was constructed by Alderwood and terminated at the King/Snohomish County Line. The County purchased the Alderwood portion of the trunk in 2001. Figure 220-4 shows the pipes that were acquired.

The northern terminus of the King County section of the trunk used to be at MH W501-16, south of the intersection of NE 192nd Street and 80th Avenue NE. This section of the trunk is shown in Figure 220-5. The connection between the trunk at the County Line and MH W501-16 was a 24-inch Northshore pipeline. The Northshore pipeline has since been replaced with a 36-inch County pipeline.

Figure 220-3. Lyon Creek, McAleer Trunk, and McAleer/Lyon Trunk

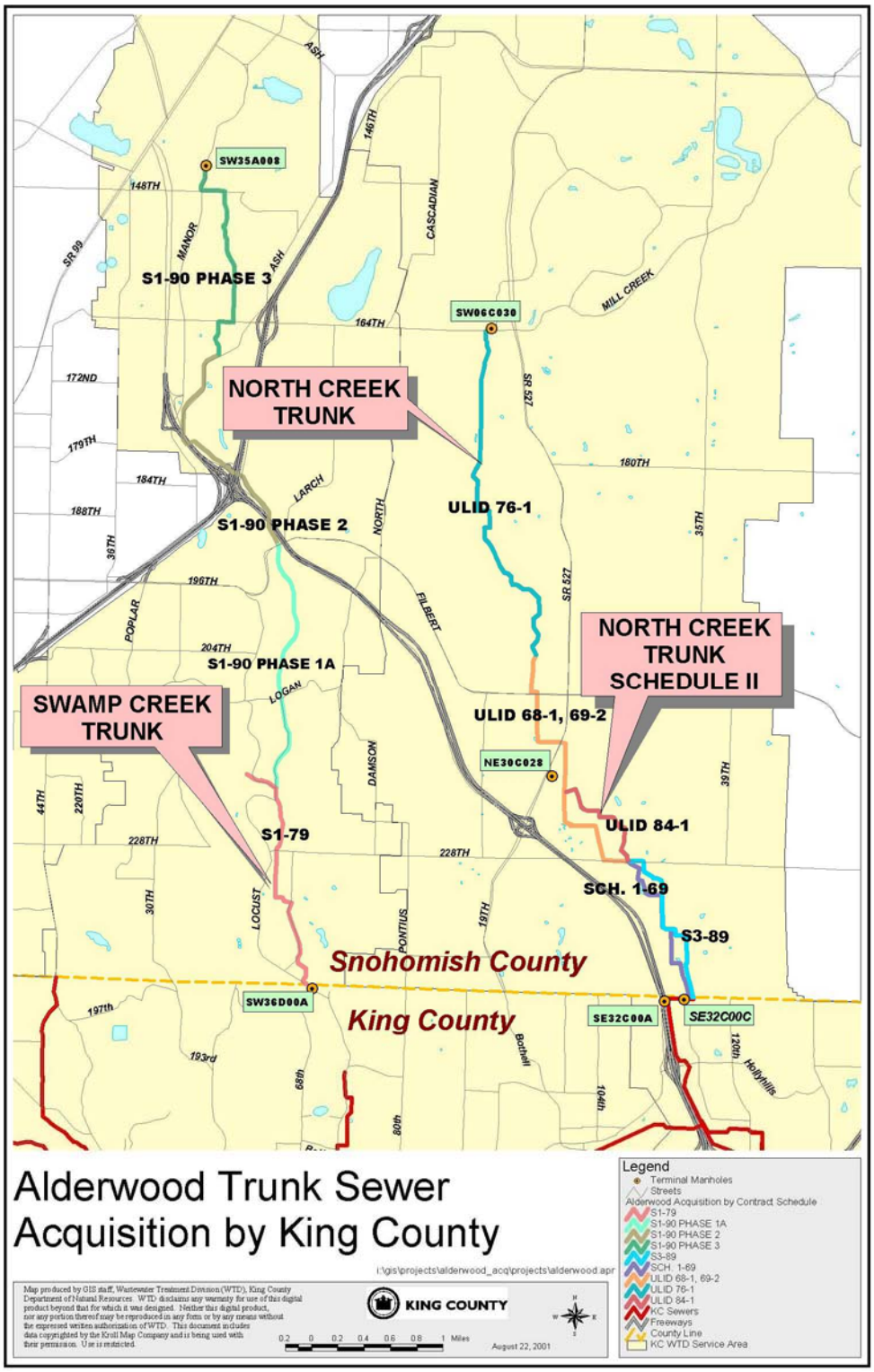

Figure 220-4. Alderwood Trunk Sewer Acquired by King County

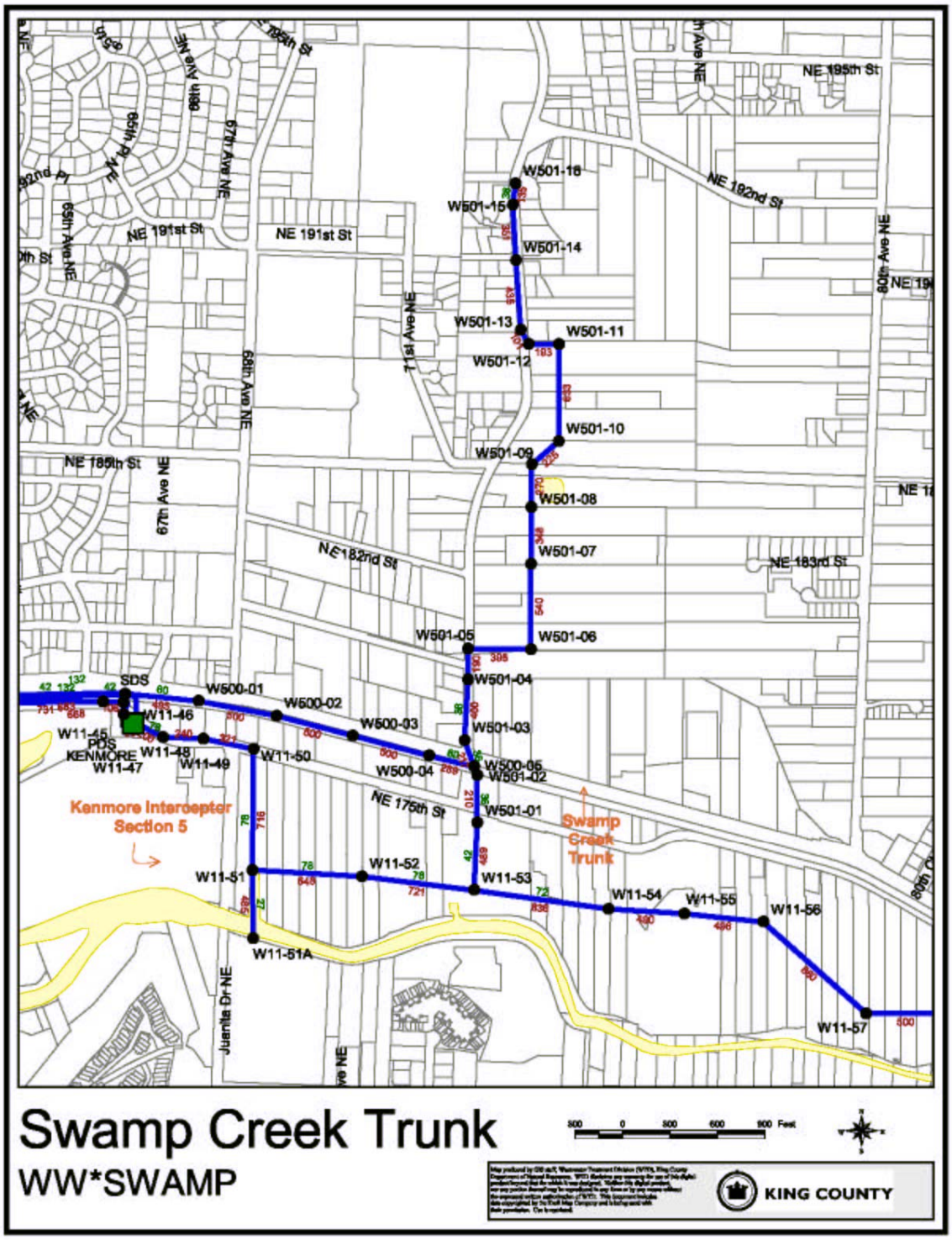

Figure 220-5. Swamp Creek Trunk in King County (Prior to Swamp Creek Trunk Extension and Alderwood Acquisition)

INGLEWOOD TRUNK

The Inglewood Trunk is a 485 LF long, 27-inch diameter pipeline that conveys flows in the Inglewood Service Basin under the Sammamish River to the Kenmore Interceptor Section 5 at MH W11-51. This trunk is shown in Figure 220-5 as the pipe that crosses the Sammamish River from MH W11-51A north to MH W11-51.

NORTH CREEK INTERCEPTOR

The King County portion of the North Creek Interceptor is a 42-inch diameter pipe that extends 6,371 LF from the King/Snohomish County Line south to the Bothell-Woodinville Interceptor near the Interstate 405/State Route 522 interchange (see Figure 220-6). This portion of the interceptor provides service to the North Creek – King Service Basin and conveys wastewater from the North Creek – Snohomish Service Basin.

As with the Swamp Creek Trunk, the portion of the North Creek Interceptor in Snohomish County was constructed by Alderwood and subsequently purchased by King County. The North Creek Interceptor in Snohomish County consists of two pipelines, Schedule I and Schedule II. North Creek Interceptor – Schedule I is 34,934 LF long of 21- to 30 inch-diameter pipe extending from a northern terminus MH SW06C030 at 164th Street SE and to the King County North Creek Interceptor at the King/Snohomish County Line. The pipes that were acquired are shown in Figure 220-4.

North Creek Interceptor – Schedule II was constructed parallel to North Creek Interceptor – Schedule I to provide additional conveyance capacity when peak flows approached the capacity of Schedule I. North Creek Interceptor – Schedule II consists of 13,701 LF of 30- and 36-inch diameter pipeline with a northern terminus approximately 250 feet east of the intersection of 19th Avenue SE and 217th Place SE (MH NE30C028) and a southern terminus at the King County North Creek Interceptor. The total length of the North Creek Interceptor is 55,006 LF.

BOTHELL-WOODINVILLE INTERCEPTOR

This interceptor extends 16,031 LF from the Woodinville Pump Station east to the Kenmore Interceptor Section 5 at MH W11-78. The pipe diameter is 30 inches at the Woodinville Pump Station, increasing to 60 inches where it connects to the Kenmore Interceptor Section 5. Figure 220-7 shows the location of this interceptor while Table 220-1 lists the characteristics of various sections of this interceptor. This interceptor collects flow from the Lower Bear Creek Trunk and North Creek Interceptor, as well as conveying wastewater from the Bothell Service Basin.

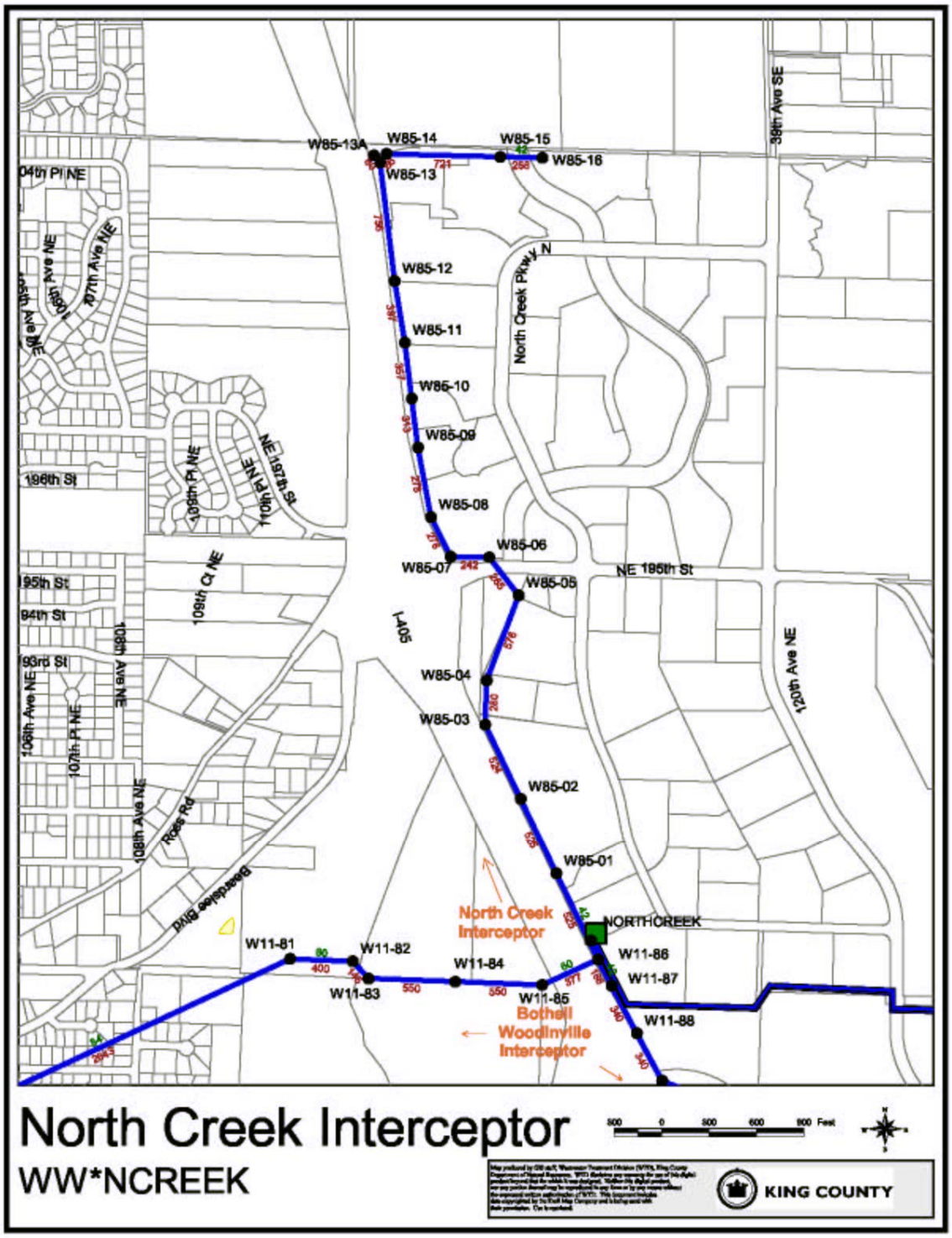

Figure 220-6. North Creek Interceptor in King County

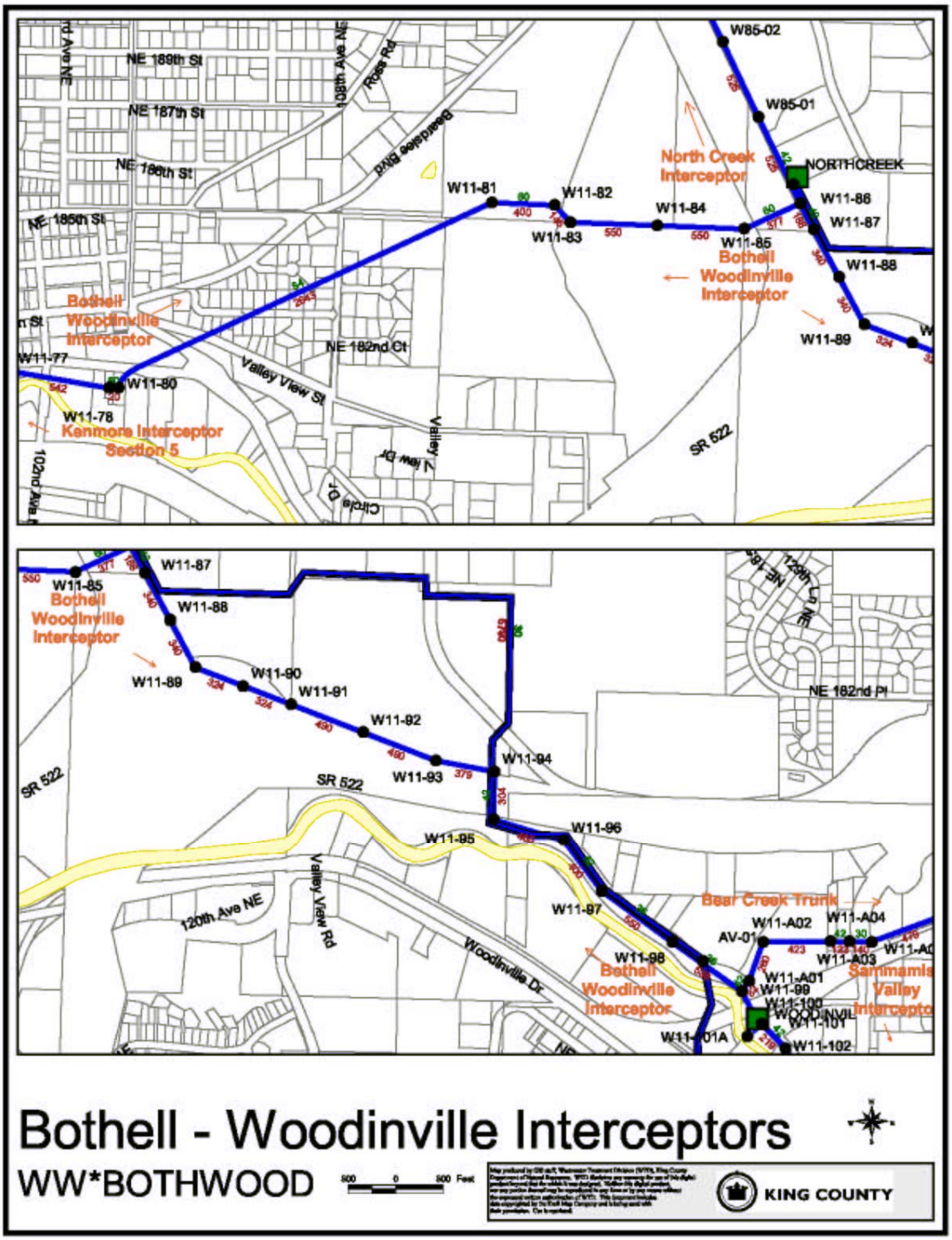

Figure 220-7. Bothell-Woodinville Interceptor

Table 220-1. Pipeline Characteristics of Bothell-Woodinville Interceptor

Pipe Section	Diameter (inches)	Length (LF)	Capacity (mgd)	Comment
Woodinville Pump Station to W11-99	30	125	49	Lower Bear Creek Trunk connection at MH W11-99
W11-99 to W11-97	36	1,088	12 – 24	
W11-97 to W11-86	42	4,044	15 – 32	North Creek Trunk connection at MH W11-86
W11-86 to W11-81	60	2,022	39 – 120	
W11-81 to W11-79	84	2,643	92	Tunnel section
W11-79 to W11-78	60	20	65	Transition to Kenmore Section 5 at MH W11-78

The Bothell-Woodinville Interceptor also conveys wastewater from the Sammamish Valley Interceptor through the Woodinville Pump Station. The flow through the Sammamish Valley Interceptor varies seasonally. During the dry weather season (May to October), the Hollywood Pump Station is typically operating to pump wastewater from the Hollywood Pump Station Service Basin through the Sammamish Valley Interceptor to the Woodinville Pump Station and the Bothell-Woodinville Interceptor. The York Pump Station would normally be on standby mode for the season.

During the wet weather season (November to April), the Hollywood Pump Station is typically shutdown, and wastewater from the service basin is conveyed to the Eastside Interceptor through the York Pump Station. The wet weather diversion reduces the risk of overflows in the downstream Kenmore Interceptor as well as significantly decreasing the flow through the Woodinville Pump Station. The diversion structures adjacent to the Hollywood Pump Station are depicted in Figure 220-8.

With increasing peak flows generated in the Hollywood Pump Station Service Basin, there will be periods in which the York Pump Station would come on-line to divert flows to the Eastside Interceptor that would otherwise go to the Kenmore Lakeline and potentially cause an overflow or use of the North Creek Storage Facility. It is currently estimated that daily total rainfall in excess of 2 inches would require the York Pump Station to activate.

Figure 220-8. Flow Diversion Structures Adjacent to the Hollywood Pump Station

In the future, this limit to begin diverting flows to the Eastside Interceptor would decrease as flows conveyed through the Kenmore Lakeline increase. Once the Brightwater Treatment System becomes operational, it is anticipated that the Hollywood Pump Station would generally convey low flows through the Woodinville Pump Station and the Bothell-Woodinville Interceptor to the Brightwater Influent Tunnel during the initial decade while the York Pump Station would activate to pump flows to the Eastside Interceptor during storms. Please refer to the Brightwater Conveyance System Predesign Report for additional detail regarding future Hollywood/York Pump Station flow management.

LOWER BEAR CREEK TRUNK

The Lower Bear Creek Trunk provides sewer service to the Bear Creek – King and Cross Valley Service Basins. The beginning of the Lower Bear Creek Trunk, MH W11-A32 at the King/Snohomish County Line, is connected to the Bear Creek Trunk, a line owned by Alderwood and the Cross Valley Water District (Cross Valley). Wastewater flows south by gravity to MH W11-99 on the Bothell-Woodinville Interceptor, immediately downstream of the Woodinville Pump Station. The location of this trunk is shown in Figure 220-9. This trunk has a diameter of 30-42 inches and a length of 10,292 LF.

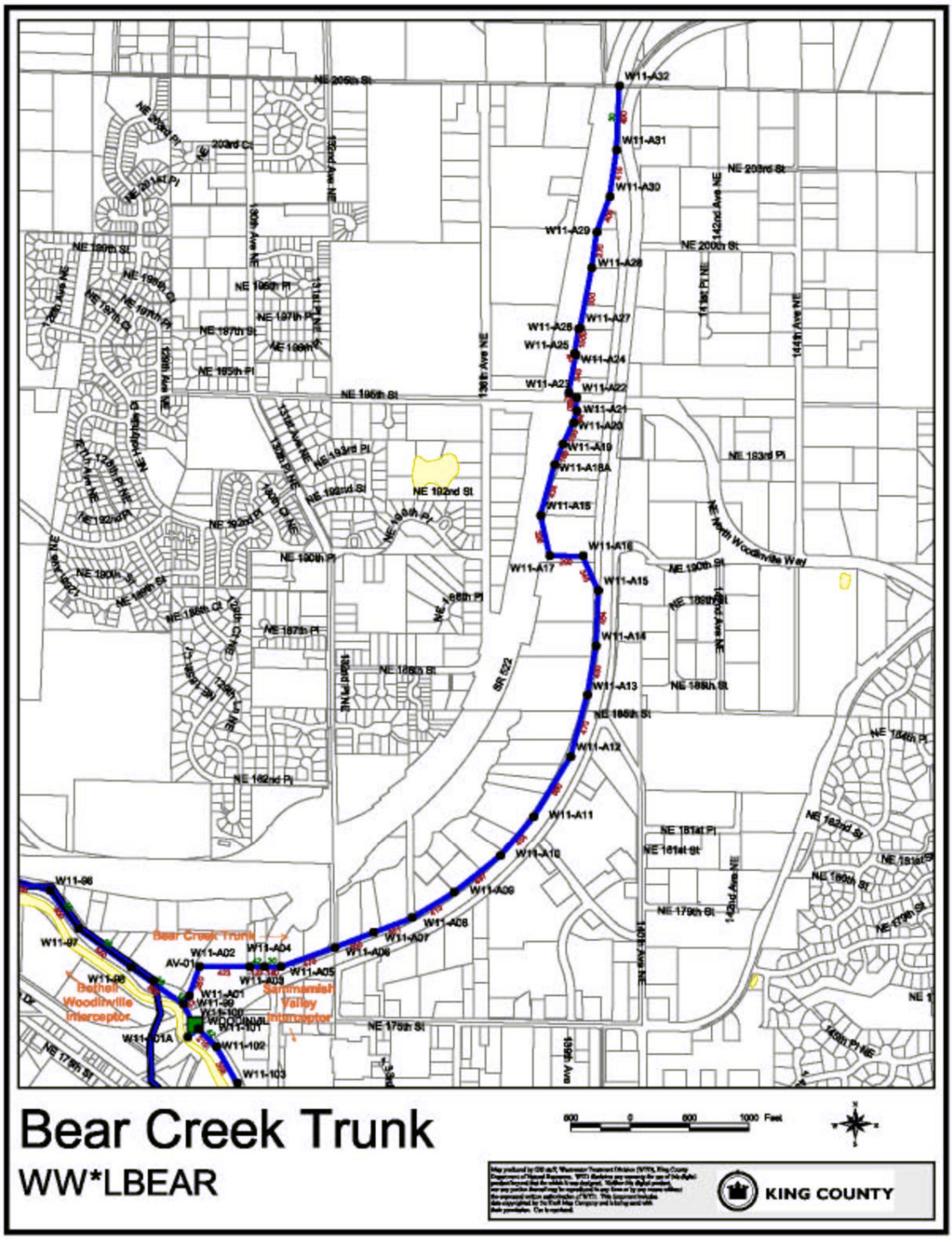

Figure 220-9. Lower Bear Creek Trunk

KENMORE INTERCEPTOR SECTION 5

Kenmore Interceptor Section 5 is downstream of all the conveyance facilities outlined previously. Wastewater from the service basins served by the Bothell-Woodinville Interceptor, North Creek Interceptor, Inglewood Trunk, and the Swamp Creek Trunk, as well as local flows from the Kenmore Section 5 Service Basin is conveyed by the Kenmore Interceptor Section 5 to the Kenmore Pump Station. Table 220-2 highlights the characteristics of the different sections of the pipeline. The total length of the interceptor is 16,031 LF. Figure 220-10 shows the eastern portion of this interceptor beginning at the connection with the Bothell-Woodinville Interceptor, while Figure 220-11 shows the remainder of the interceptor and the connections with the Swamp Creek Trunk and the Inglewood Trunk.

Table 220-2. Pipeline Characteristics of Kenmore Interceptor Section 5

Pipe Section	Diameter (inches)	Length (LF)	Capacity (mgd)	Comment
W11-78 to W11-70	60	3,911	42 – 69	Connection from Bothell-Woodinville Interceptor
W11-70 to W11-69	78	1,467	109	Tunnel Section
W11-69 to W11-53	72	7,730	31 – 109	Swamp Creek Trunk connection at MH W11-53
W11-53 to W11-51	78	1,369	88 – 89	Inglewood Interceptor connection at MH W11-51
W11-51 to Kenmore Pump Station	78	1,527	60 – 120	Pipe capacity reduces to approximately 18 mgd at one location between MH 11-48 and MH W11-51

Pipe settling occurred shortly after the construction of the interceptor from MH W11-51 downstream to MH W11-48. To correct the adverse invert and the resultant pipe separation, a transition structure was installed and the pipe invert in the entire area of pipe settling was paved to restore gravity flow. Figure 220-12 is an as-built drawing of the area with pipe separation and the most settling. As a result of the repair, the diameter in the 78-inch pipe is reduced to as small as 50 inches; the conveyance capacity of the interceptor is correspondingly reduced to approximately 18 mgd at this point.

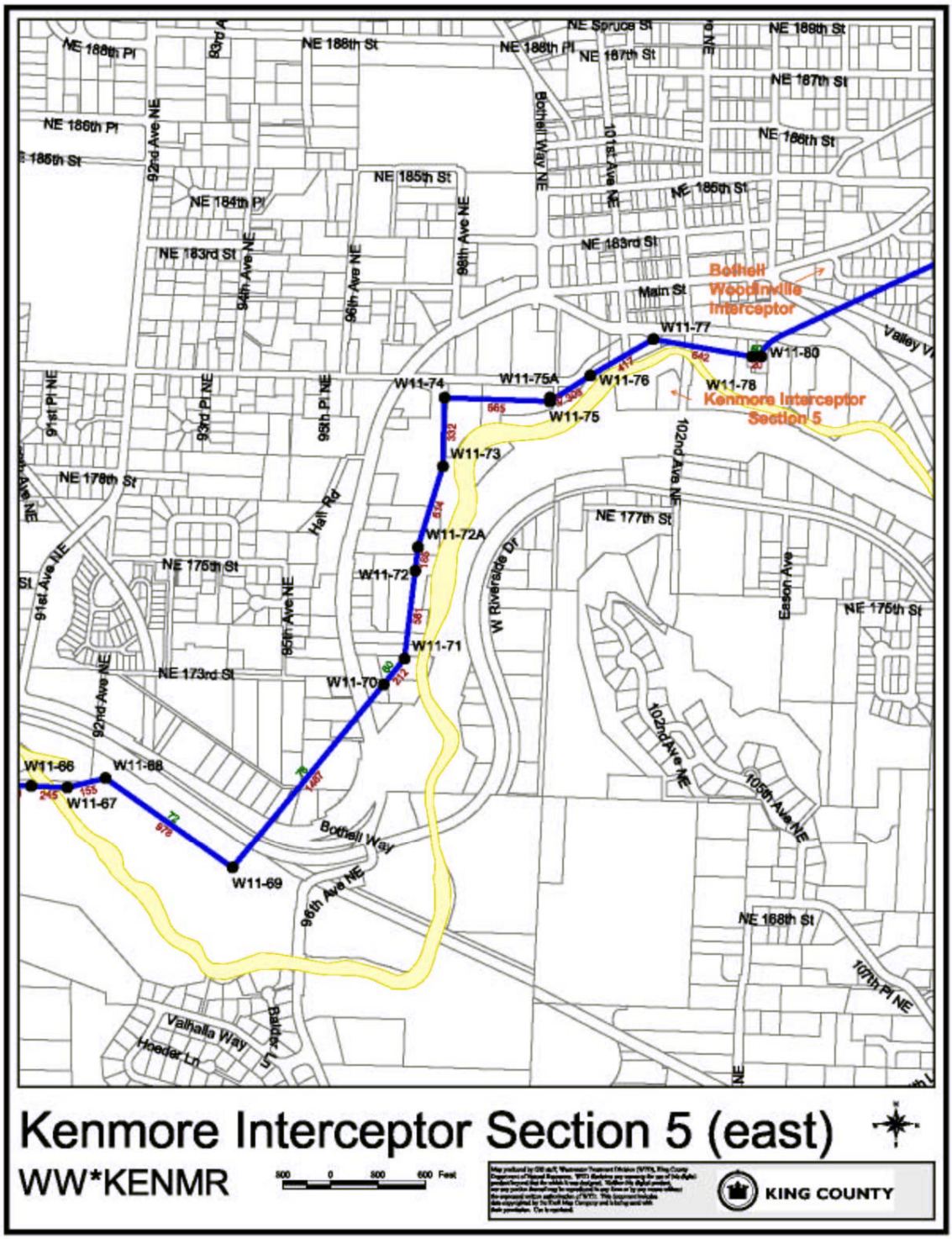

Figure 220-10. Eastern Portion of Kenmore Interception Section 5

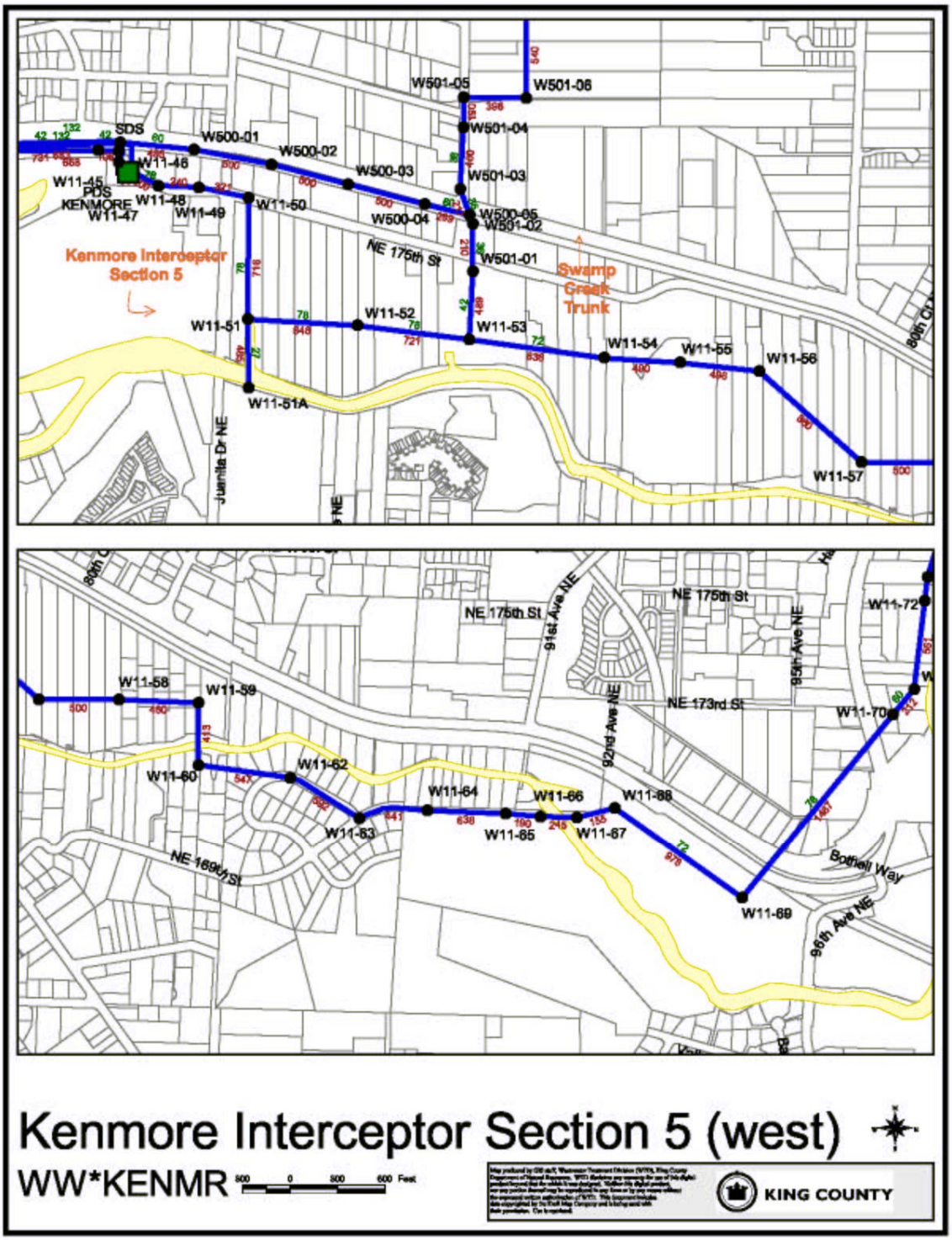

Figure 220-11. Western Portion of Kenmore Interceptor Section 5

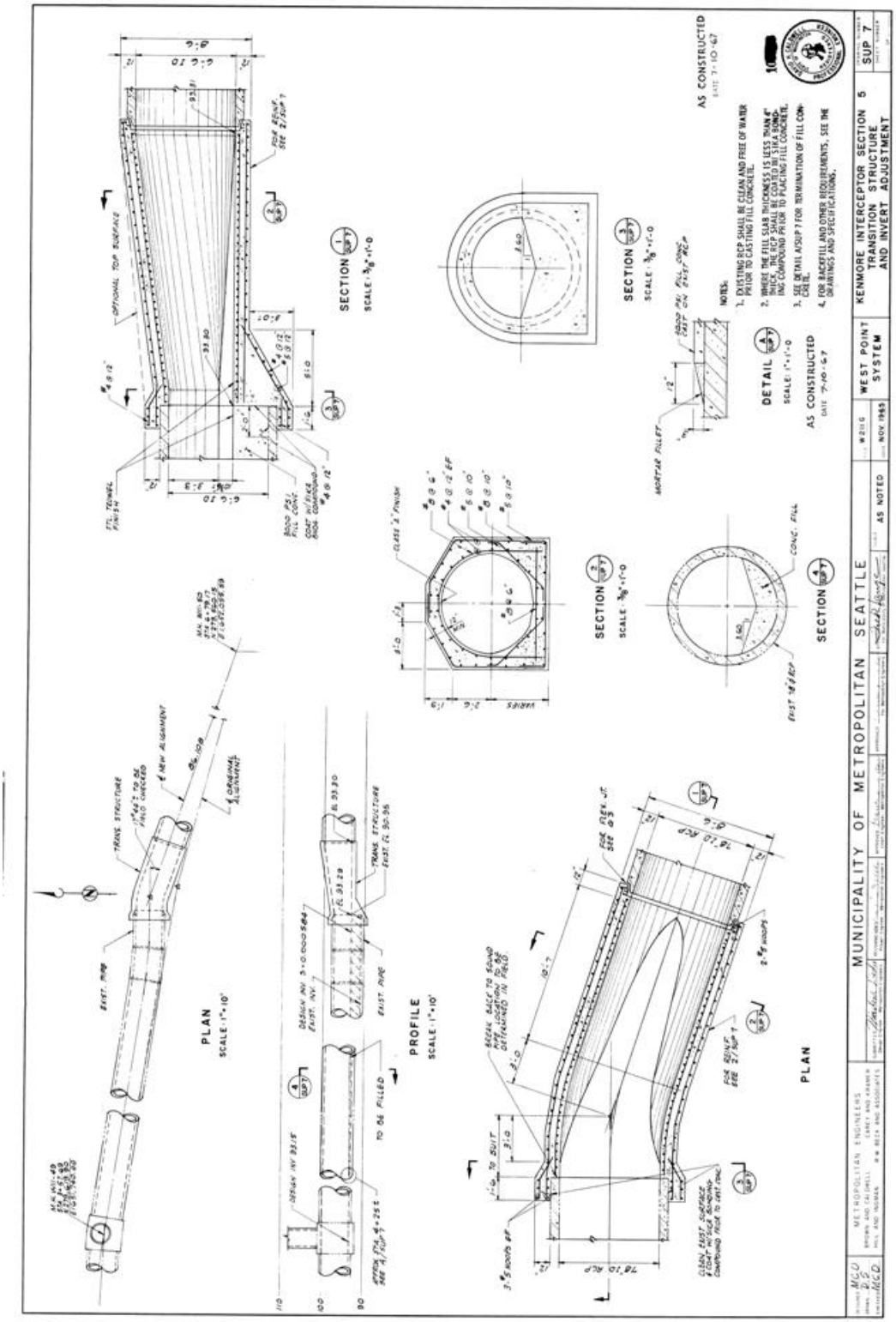

Figure 220-12. Restriction in Kenmore Interceptor Section 5

KENMORE INTERCEPTOR SECTION 3

The Kenmore Interceptor Section 3 is the reach of the Kenmore Interceptor downstream of the Kenmore Pump Station Primary Distribution Structure before the interceptor enters Lake Washington. The interceptor is 4,042 LF of 42-inch diameter pipe. A connection with the Logboom Regulator Station to the interceptor is between MH W11-42 and MH W11-41 to drain the Logboom Storage Facility after a peak flow event. Characteristics of the Kenmore Interceptor Section 3 are listed in Table 220-3. Figure 220-13 shows the location of this pipeline.

Table 220-3. Pipeline Characteristics of Kenmore Interceptor Section 3

Pipe Section	Diameter (inches)	Length (LF)	Capacity (mgd)	Comment
Kenmore Primary Distribution Structure to MH W11-43	42	1,514	31 – 89	Lake Forest and Lake-Forest Snohomish flows enter interceptor through a Northshore connection at MH W11-43
W11-43 to Logboom Regulator Station	42	1,421	30 – 31	Logboom Storage Facility drains to interceptor at regulator station
Logboom Regulator Station to MH W11-39	42	1,107	30 – 35	Transition to 48-inch diameter Kenmore Lakeline at MH W11-39

LOGBOOM STORAGE FACILITY AND LOGBOOM PARK REGULATOR STATION

The four million gallon (MG) Logboom Storage Facility and the Logboom Park Regulator Station was constructed in 1988 to attenuate 20-year peak flows through the Kenmore Lakeline. The facility consists of dual 132-inch diameter, 2,872 LF-long pipes between the Kenmore Secondary Distribution Structure and the Logboom Park Regulator Station and parallel to the Kenmore Interceptor Section 3. Figure 220-13 shows the approximate location of the facilities in the North Lake Washington area.

The storage facility is filled and drained by gravity through the Secondary Distribution Structure and the Logboom Regulator Station, respectively. Storage filling begins when flows exceed 16 mgd at the Kenmore Pump Station. The Logboom Park Regulator Station is located at the Tracy Owens Park (6001 NE Bothell Way) in Kenmore, next to the Burke-Gilman Trail. Critical elevations for the station are listed in Table 220-4 and a picture of the station is in Figure 220-14.

Table 220-4: Critical Elevations for Logboom Park Regulator Station

Overflow elevation (feet)	109.50
Overflow weir elevation (feet)	119.50
Overflow location	Kenmore Interceptor Section 3
Note: elevations listed in Metro Datum Source: Offsite Facilities and Miscellaneous Structures Manual: Volume 2, West Division (Metro, 1993)	

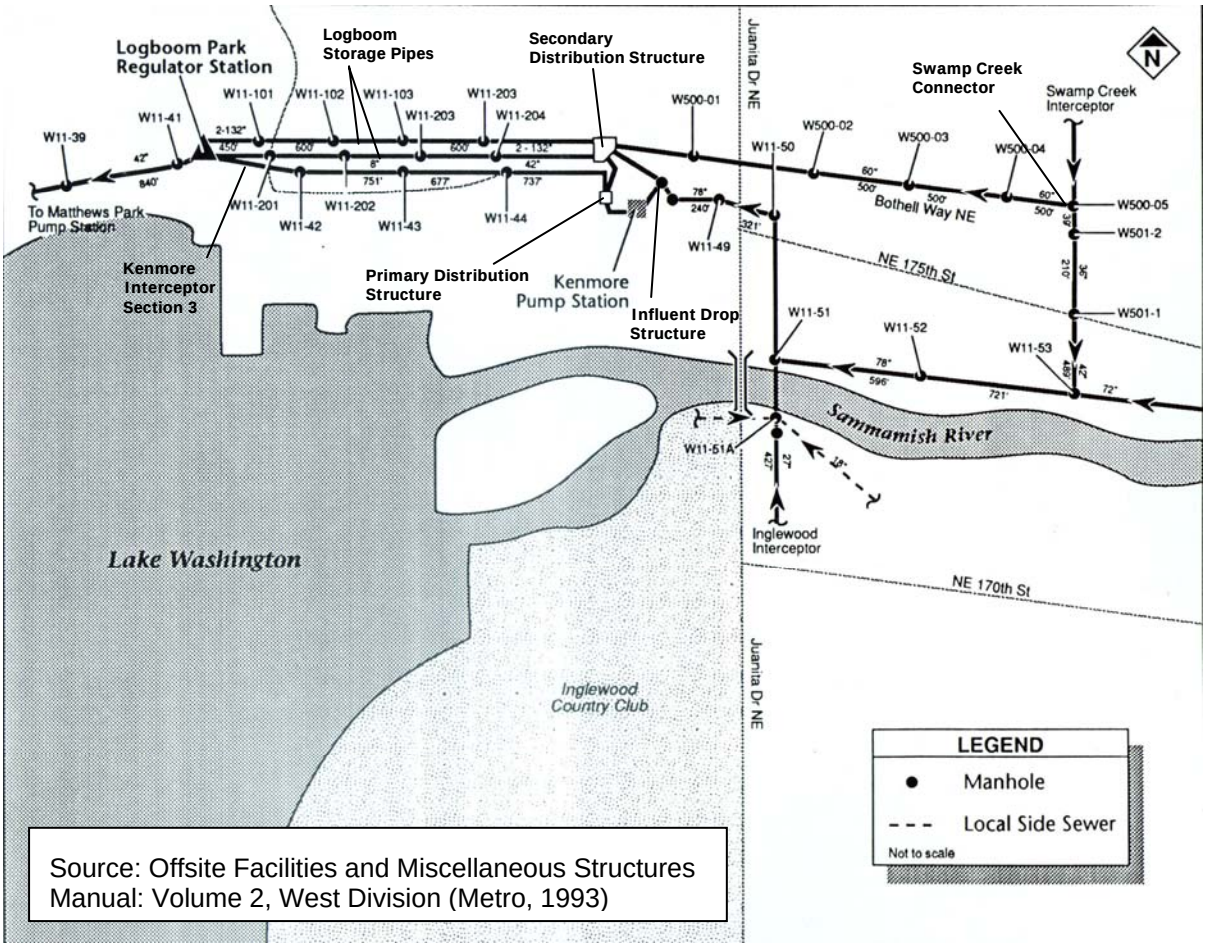

Figure 220-13. Location of King County Facilities in North Lake Washington

Figure 220-14. Logboom Park Regulator Station

NORTH CREEK STORAGE FACILITY

The North Creek Storage Facility adjacent to the North Creek Pump Station was put into operation in late 2003. The 6 MG facility is an underground rectangular cast-in-place vault with internal walls to separate the storage area into five compartments. The facility fills by surcharging the Kenmore Interceptor Section 5 and Bothell-Woodinville Interceptor and backflowing wastewater from the Kenmore area to the North Creek Diversion Structure. Figure 220-15 shows a schematic of how flow diversions to the storage facility will be achieved. The facility will be drained within a 24-hour period using pumps discharging to the North Creek Interceptor upstream of the North Creek Pump Station.

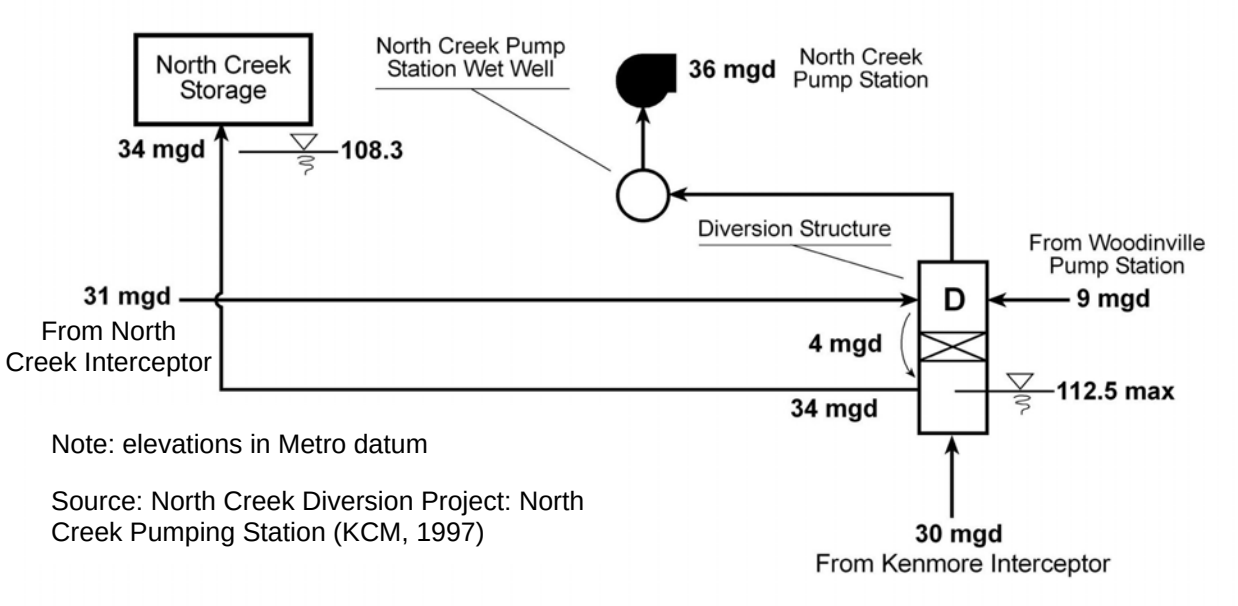

Figure 220-15. Flow Diversion to North Creek Storage Facility

LAKE BALLINGER PUMP STATION

The Lake Ballinger Pump Station is located at 2205 N 205th Street in Shoreline. This facility was constructed in 1993 to implement the Edmonds Flow Transfer Agreement between King County and the City of Edmonds to pump flow from the Lake Ballinger – Snohomish Service Basin northwest to the Edmonds Treatment Plant or southeast to the Lake Ballinger McAleer Trunk. See the Task 210 report for information regarding the Edmonds Flow Transfer Agreement. Table 220-5 describes the characteristics of the facility.

The Lake Ballinger Pump Station pumps flows received from areas of Edmonds, Mountlake Terrace (MLT), Olympic View Water and Sewer District (Olympic) and the Ronald Wastewater District (Ronald). The station has a capacity to pump up to 7 mgd to Edmonds and 9.8 mgd to the McAleer Trunk; generally, the facility pumps about 2 to 3 mgd on average.

Through January 1, 2012, during the wet weather season, all flows from the Lake Ballinger Pump Station are pumped to Edmonds. However, during extreme storms, flows that exceed the station's 7 mgd capacity to pump to Edmonds are sent to the West Point Treatment Plant for treatment. During the dry half of the year, the pump station sends a portion of the flow entering station to the McAleer Trunk and West Point Treatment Plant to match the amount of flow the Edmonds Treatment Plant receives from the County's Richmond Beach Pump Station (located west of the North Lake Washington Planning Area). Typically, the balance of the flow pumped at the Lake Ballinger Pump Station, approximately 1 mgd, is pumped to Edmonds regardless of time of year. At present, King County treats about 2 mgd of Lake Ballinger – Snohomish flows at the West Point Treatment Plant during dry weather periods.

After 2012, King County will convey and treat the flows all year according to this agreement. The underlying financial intent of the agreement is that King County and Edmonds would each be treating the same volume of flow so the agreement is revenue/cost neutral when equivalent flows are treated.

Table 220-5. Lake Ballinger Pump Station Description

Item	Value
Firm pumping capacity (mgd)	7.0 to Edmonds, 9.8 to McAleer
Total dynamic head (feet)	125 to Edmonds, 190 to McAleer
Backup power	Dual power feed from Seattle City Light and Snohomish PUD and 800 kW standby generator
Inlet sluice gate elevation (feet)	366.37
Overflow elevation (feet)	378.00
Overflow location	McAleer Creek at the Nile Golf and Country Club
Note: elevations listed in Metro datum Source: Offsite Facilities and Miscellaneous Structures Manual – Volume 2, West Division (1993).	

KENMORE PUMP STATION

The Kenmore Pump Station is located at 6719 NE 175th Street, near the intersection of NE 175th Street and 68th Avenue NE in Kenmore (see Figure 220-16). The station has four pumps with a firm pumping capacity of 18.4 mgd. Table 220-6 highlights the pump station's critical elevations and pumping capacity. Flow to the pump station comes from the Kenmore Interceptor Section 5 and is discharged to the Kenmore Primary Distribution Structure and Kenmore Interceptor Section 3. Figure 220-13 shows the location of the Kenmore Pump Station in relation to other conveyance facilities in the North Lake Washington area.

Figure 220-17 is a flow schematic of the Kenmore Pump Station, Logboom Storage Facility, and Logboom Park Regulator Station. Flows in excess of 16 mgd into the Kenmore Pump Station are shunted at the Primary Distribution Structure through the Secondary Distribution Structure to the Logboom Storage Facility to prevent overflows in the Kenmore Lakeline. In addition, flows in excess of the capacity of the Kenmore Pump Station are diverted past the station directly to the Logboom Storage Facility at both the Influent Drop Structure and the Swamp Creek Connector.

Figure 220-16. Kenmore Pump Station

Table 220-6. Kenmore Pump Station Operating Parameters

Parameter	Value
Firm pumping capacity (mgd)	18.3
Total dynamic head (feet)	24.0 and 32.0
Backup power	Dual transformer feeds from single substation and 500 kW standby generator
Wet well grating elevation (feet)	100.00
Overflow elevation (feet)	116.50
Overflow location	Sammamish River at MH W11-51A
Note: elevations listed in Metro datum Sources: Offsite Facilities and Miscellaneous Structures Manual – Volume 2, West Division (1993); Wastewater 2020 Plus – Existing Conditions (1994).	

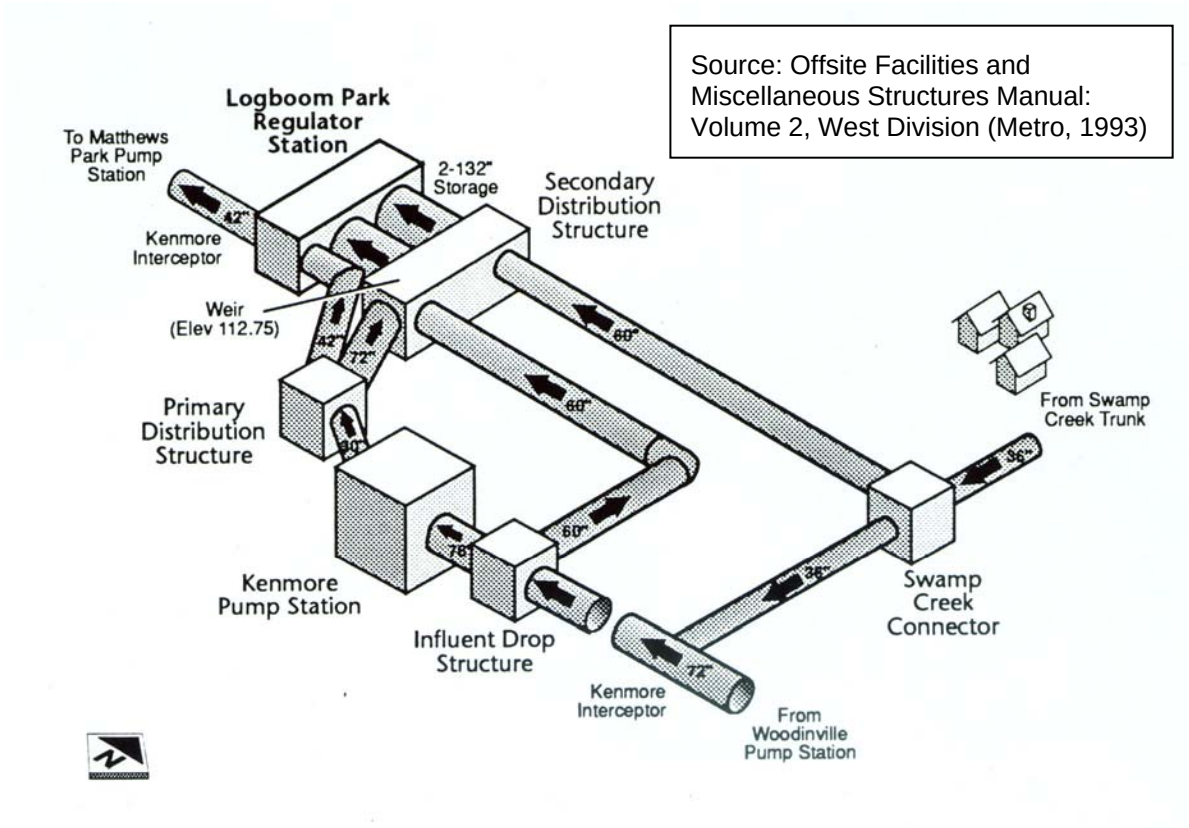

Figure 220-17. Flow Schematic of Kenmore Pump Station and Logboom Storage Facility

NORTH CREEK PUMP STATION

Located at the junction of the North Creek Interceptor and the Bothell-Woodinville Interceptor, the North Creek Pump Station became operational in December 1999 as a part of a multi-service basin flow diversion plan to minimize the potential for overflows from the Kenmore Lakeline. The address of the facility is 18707 North Creek Parkway in Bothell. This facility is depicted in Figure 220-18 and the operational parameters are summarized in Table 220-7.

With the construction of the 36 mgd North Creek Pump Station, wet weather flows from the North Creek – King, North Creek – Snohomish, Cross Valley, Woodinville, East Woodinville, and Bear Creek - King Service Basins can be pumped during wet weather months to the York Pump Station and Eastside Interceptor for treatment at the South Treatment Plant. The diversion of these service basins reduced flows in the Kenmore Lakeline and maintained the County conveyance design standard of a 20-year flow event. During summer months, the North Creek Pump Station is shut down and wastewater flows by gravity down the Bothell-Woodinville and Kenmore Interceptor towards the West Point Treatment Plant.

Figure 220-18. North Creek Pump Station

Table 220-7. North Creek Pump Station Basic Operating Parameters

Parameter	Value
Firm pumping capacity (mgd)	36
Total dynamic head (feet)	105
Backup power	1,200 kW standby generator
Wet well grating elevation (feet)	116.00
Overflow elevation (feet)	112.50
Overflow location	W11-51A (see note)
Elevations in Metro datum. Note: At high water alarm, influent gate closes and flows enter to Bothell-Woodinville Interceptor and Kenmore Pump Station. Overflow point is the Kenmore Pump Station overflow. Sources: Offsite Facilities and Miscellaneous Structures Manual – Volume 2, West Division (1993); Wastewater 2020 Plus – Existing Conditions (1994).	

WOODINVILLE PUMP STATION

The Woodinville Pump Station is located near the intersection of NE 175th Street and Woodinville-Duvall Road in Woodinville and shown in Figure 220-19. Table 220-8 lists the pump station's critical elevations and pumping capacity. The pump station currently lifts wastewater from the Sammamish Valley Interceptor to the Bothell-Woodinville Interceptor.

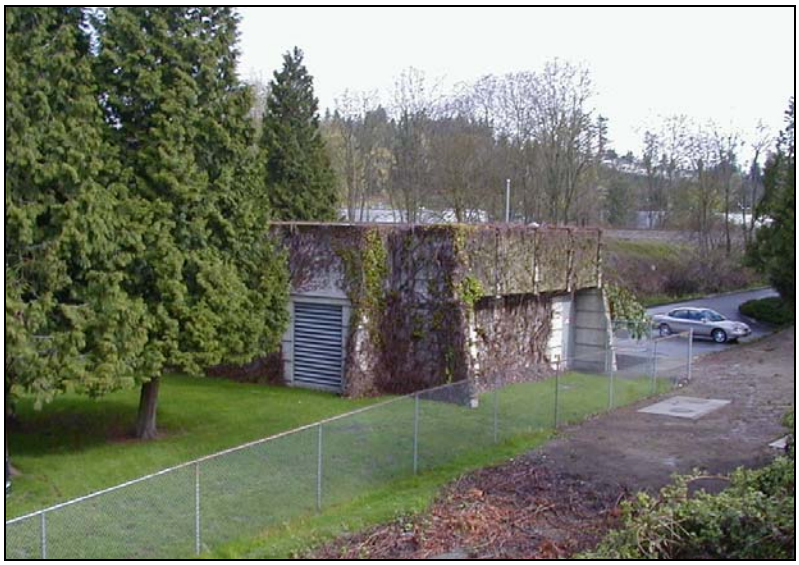

Figure 220-19. Woodinville Pump Station

Table 220-8. Woodinville Pump Station Basic Operating Parameters

Parameter	Value
Firm pumping capacity (mgd)	17.6
Total dynamic head (feet)	21.3
Backup power	125 kW standby generator
Wet well grating elevation (feet)	114.00
Overflow elevation (feet)	117.00
Overflow location	Sammamish River through a 24-inch diameter line from an associated overflow structure at MH W11-101.
Note: elevations in Metro datum. Sources: Offsite Facilities and Miscellaneous Structures Manual – Volume 2, West Division (1993); Wastewater 2020 Plus – Existing Conditions (1994).	

Flow to the Woodinville Pump Station varies seasonally. Summer flows are significantly greater than winter flows. Typically, summertime flows generated upstream of the Hollywood Pump Station is conveyed in the Sammamish Valley Interceptor to the Woodinville Pump Station (see Figure 220-20). However, large rainstorms would require the upstream York Pump Station to turn on and divert flows that would normally be conveyed to the Woodinville Pump Station to the Eastside Interceptor. As a result, the Woodinville Pump Station would be pump substantially less flows during storms than it

currently does. Additional detail regarding this summertime flow diversion is in the previous discussion for the Bothell-Woodinville Interceptor.

During the winter, the Hollywood Pump Station is typically off, and wastewater from the Hollywood Pump Station Service Area flows to the York Pump Station, which discharges to the Eastside Interceptor and the South Treatment Plant. As a result, in the winter, the Woodinville Pump Station only receives wastewater from the City of Woodinville and a limited number of residences that discharge into the Sammamish Valley Interceptor downstream of the Hollywood Pump Station.

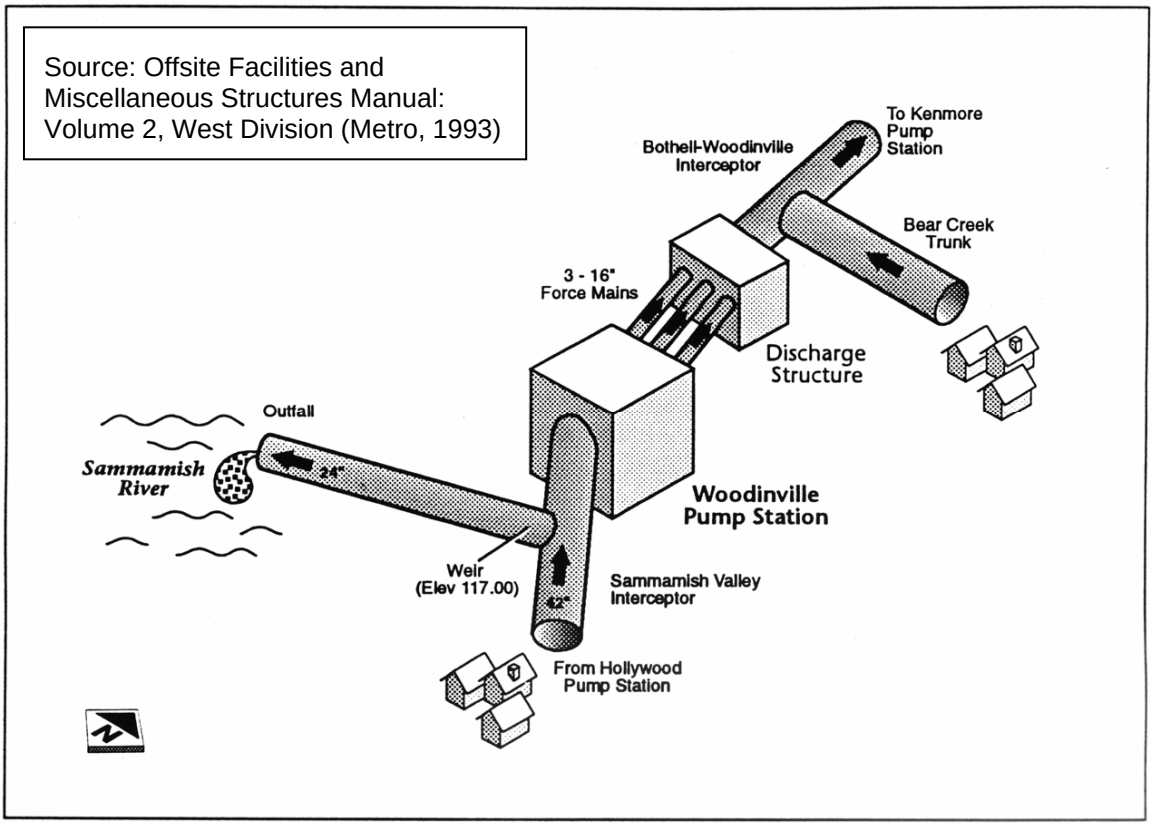

Figure 220-20. Flow Schematic of Woodinville Pump Station

OTHER EXISTING FACILITIES

Eleven local sewer agencies also operate wastewater facilities in the North Lake Washington Planning Area. Besides the previously mentioned Alderwood, Northshore, Cross Valley, Olympic View, Ronald, and MLT, the other agencies are the Woodinville Water District (Woodinville), City of Bothell (Bothell), City of Brier (Brier), City of Lake Forest Park (LFP), and the Silver Lake Water District (Silver Lake). Of these cities and districts, Alderwood has the most extensive facilities and whose operations have the most impact upon the flows in the King County system.

ALDERWOOD WATER & WASTEWATER DISTRICT

Alderwood provides collection services to the majority of the King County Service Area in Snohomish County as well as to one basin outside of the County's service area. The district's wastewater system is comprised of 24.2 miles of mainline gravity sewer trunks, 14 lift stations, and the 3-mgd average daily flow (ADF) Picnic Point Wastewater Treatment Facility in addition to many miles of local service laterals. The Picnic Point facility is located in the Alderwood Picnic Point Basin, which is designated by King County as part of the Mukilteo Service Basin and is outside the King County Service Area. The Alderwood service area is shown in Figure 220-21.

Table 220-9 lists the major characteristics of the Alderwood sewer trunks within the North Lake Washington Planning Area. Capital improvement plan (CIP) in the *Alderwood Water and Wastewater District Comprehensive Plan – Volume 1* (2000) indicated that in 2008, the Larch Way Trunk would be scheduled to have 2,760 LF of the 15-inch diameter pipeline replaced with 21-inch pipe to provide build-out capacity in the service area. At the same time, the Olympus Meadows Trunk may have a portion of the line enlarged to 21-inch diameter pipe. This work is to provide service to the Silver Lake South Undeveloped Area and to an Unclaimed Service Area. Since the publication of the comprehensive plan, Silver Lake has annexed the Unclaimed Service Area and design is underway to provide wastewater service to a new residential development in the both the South Undeveloped Area and the Unclaimed Service Area. Alderwood is currently evaluating the impacts of the new development on the Olympus Meadows Trunk and determine if upgrades are required. In addition to these two areas, Alderwood conveys flows from the Silver Lake Tributary Area through Alderwood's Penny Creek Trunk at five connections located at the district's boundary with the Mill Creek city limits.

Alderwood has interlocal flow transfer agreement with Bothell to provide sewer service to all but two areas of Bothell within Snohomish County. Alderwood also transfers flows from two areas in the Alderwood Swamp Creek Service Basin (which is analogous to King County's Swamp Creek Service Basin) to Northshore through two 8-inch laterals located at the King/Snohomish County Line. Brier has numerous connections to the portion of the Alderwood Larch Way Trunk located with the Brier city limits.

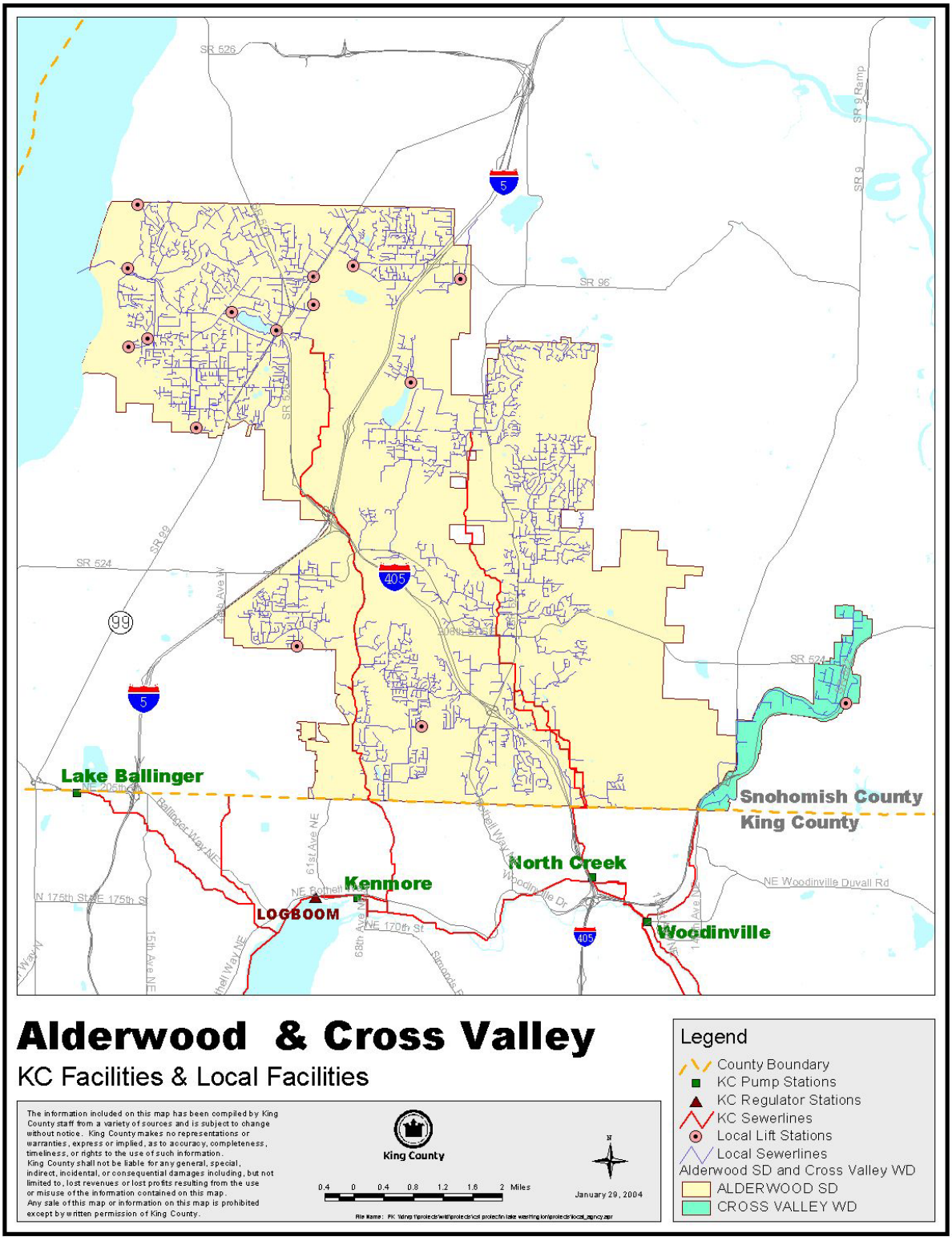

Figure 220-21. Alderwood Water & Wastewater District and Cross Valley Water District Service Areas

Table 220-9. Alderwood Water & Wastewater District Sewer Trunks In the North Lake Washington Planning Area

Trunk	Discharge Location	Pipe Diameter (inches)	Total Length (LF)	King County Basin Served
Lift Station #3 Diversion	Swamp Creek Trunk	8-16	11,963	Swamp Creek – Snohomish
Locust Way Trunk	Swamp Creek Trunk	12	1,296	Swamp Creek – Snohomish
Martha Lake Trunk	Swamp Creek Trunk	12-18	18,438	Swamp Creek – Snohomish
Larch Way Trunk	Swamp Creek Trunk	12-36	14,990	Swamp Creek – Snohomish
Meridian Trunk	Swamp Creek Trunk	12	9,318	Swamp Creek – Snohomish
North Creek Martha Lake Branch	North Creek Trunk	8-12	8,223	North Creek – Snohomish
North Creek Bothell Branch	North Creek Trunk	8-16	12,647	North Creek – Snohomish
North Creek Fitzgerald Branch	North Creek Trunk	10	3,401	North Creek – Snohomish
North Creek Canyon Park Branch	North Creek Trunk	10	2,461	North Creek – Snohomish
Olympus Meadows Trunk	North Creek Trunk	12-15	17,686	North Creek – Snohomish
Queensborough Interceptor	North Creek Trunk	10-15	12,274	North Creek – Snohomish
Penny Creek Trunk	North Creek Trunk	15-18	12,395	North Creek – Snohomish
Bear Creek Trunk(1)	Lower Bear Creek Trunk	30(2)	2,770(2)	Cross Valley

(1): Co-owned with the Cross Valley Water District.
(2): Pipe diameter and length within Alderwood. The entire line is approximately 5,500 LF of 12 – 30 inch pipe.

Source: Alderwood Water & Wastewater District Sanitary Sewer Comprehensive Plan, Volume 1 (HDR Engineering, 2000).

The Picnic Point Treatment Facility is scheduled to be replaced with a new facility at the same site. The new Picnic Point plant will have an initial capacity of 6 mgd ADF, with provisions for expansion to 12 mgd ADF. Currently, Alderwood is evaluating various treatment technologies for the treatment plant. Construction is scheduled to start in 2005 and end in 2007. Under the current Alderwood service strategy, only wastewater from Alderwood's Picnic Point Basin will be sent to the upgraded facility. The strategy also includes the possibility of diverting flows from either the northern third or two-thirds of the Swamp Creek – Snohomish Service Basin to the new Picnic Point plant if deemed practical in the future. Alderwood has stated that the new treatment plant only provide treatment service for customers within its service area boundaries.

CROSS VALLEY WATER DISTRICT

Until the construction of the Bear Creek Trunk in 1998, wastewater treatment in the Cross Valley service area was limited to on-site treatment with septic tanks and leach fields. The trunk is a 12-inch to 30-inch diameter line that was built in conjunction with Alderwood. The 30-inch diameter portion of the conveyance line extends from the intersection of 223rd Place SE and State Street south to the County's Lower Bear Creek Trunk at the King/Snohomish County Line. Since the completion of the Bear Creek Trunk, new sewer lines have installed to provide service to the portion of the Cross Valley service area within the Maltby UGA. All the new sewer lines connect to the Bear Creek Trunk.

Under the 1997 *Cross Valley Water District/Alderwood Water District Interlocal Agreement for Sanitary Sewer Construction*, Cross Valley maintains the pipeline and is allocated 9.22 mgd of the 11.61 mgd total capacity of the 30-inch diameter section of the pipeline. The remaining 2.39 mgd capacity in the pipeline is allocated to Alderwood, though no flow from Alderwood is currently conveyed by the Bear Creek Trunk due to a lack of sanitary sewer connections in the Alderwood Bear Creek Basin.

WOODINVILLE WATER DISTRICT

Woodinville serves an area from the Woodinville UGA to the rural areas east of the Blakely Ridge Development, though service is currently limited to within the UGA. Figure 220-22 shows the district's service area. The current CIP developed by Woodinville extends through 2004 and would expand the district's sewered area. In 2002, 3,850 LF of 8-inch diameter gravity sewers were laid in the district's southwest corner. A new 1,300 LF 8-inch diameter line will be built in 2003 bring service to an area of Woodinville where service is currently provided by Bothell.

Construction of 16,200 LF of gravity sewer pipes and forcemains and one pump station were scheduled to begin in 2004. This new line would extend service to the East Woodinville Service Basin, an area that currently has little access to the King County system.

CITY OF BOTHELL

Bothell provides local service to areas within its city limits, a portion of its Urban Growth Area (UGA) in King County, and two small areas in Snohomish County (see Figure 220-22). Alderwood provides service to the remainder of Bothell in Snohomish County. The improvements that Bothell listed in the 1994 *City of Bothell Sanitary Sewer System Plan* were annual I/I improvements, replacement of aging lines, and a 2,200 LF extension of an existing 8-inch diameter sewer. The CIP in the 1994 plan ended in 2001. Bothell started producing a new comprehensive plan in 2003. This plan has not yet been finished.

CITY OF BRIER

Brier's service area is located within the City of Brier's city limits immediately north of the King/Snohomish County Line. The agency has approximately 23 miles of 8 – 12-inch diameter gravity sewer lines, one 245-gpm pump station and no wastewater treatment facilities. Flows generated within the district are either treated on-site with septic systems or conveyed to King County system for ultimate treatment.

The Brier system is within the County's Swamp Creek – Snohomish, Lake Forest – Snohomish, Lyon, and Lake Ballinger – Snohomish Service Basins. The portion of Brier located in the Swamp Creek – Snohomish Service Basin is partially sewered. Wastewater from the basin enters Alderwood's Larch Way Trunk in six locations. The Alderwood designation for the Brierwood sewer basin is the Brier Tributary Area. The 2000 *Draft City of Brier Comprehensive Sewer Plan* states that 2,538 LF of additional gravity sewer mains will be installed in the future to provide conveyance services to the unsewered portion of the basin. The plan did not state a completion date for the construction.

Wastewater from approximately 520 Brier connections in the Lake Forest – Snohomish Service Basin is conveyed to the Northshore system at two locations. This flow transfer is governed by an agreement between Brier and Northshore. An additional 90 connections from Alderwood connects to the Brier system, which then conveys the flows to the second connection to Northshore. This flow transfer is conducted under an agreement between Brier and Alderwood, who in turn has a separate agreement with Northshore. Brier's lone pump station is located in this area.

Brier has an interlocal agreement with MLT to govern the flows in the County's Lyon Service Basin. Brier owns and maintains a sewer main that connects the Brier system to the County's Lyon Interceptor at the King/Snohomish County line. This pipeline is located within both the MLT city limits and service area. The interlocal agreement allows the portion of MLT located in the Lyon Service Basin to connect to Brier's pipeline.

Brier currently has 61 homes in the Lake Ballinger – Snohomish Service Basin. According to the comprehensive plan, a 975 LF gravity sewer will be installed in the unspecified future. The new sewer will convey flows to MLT's Windermere pump station. This flow will eventually reach the County's Lake Ballinger Pump Station.

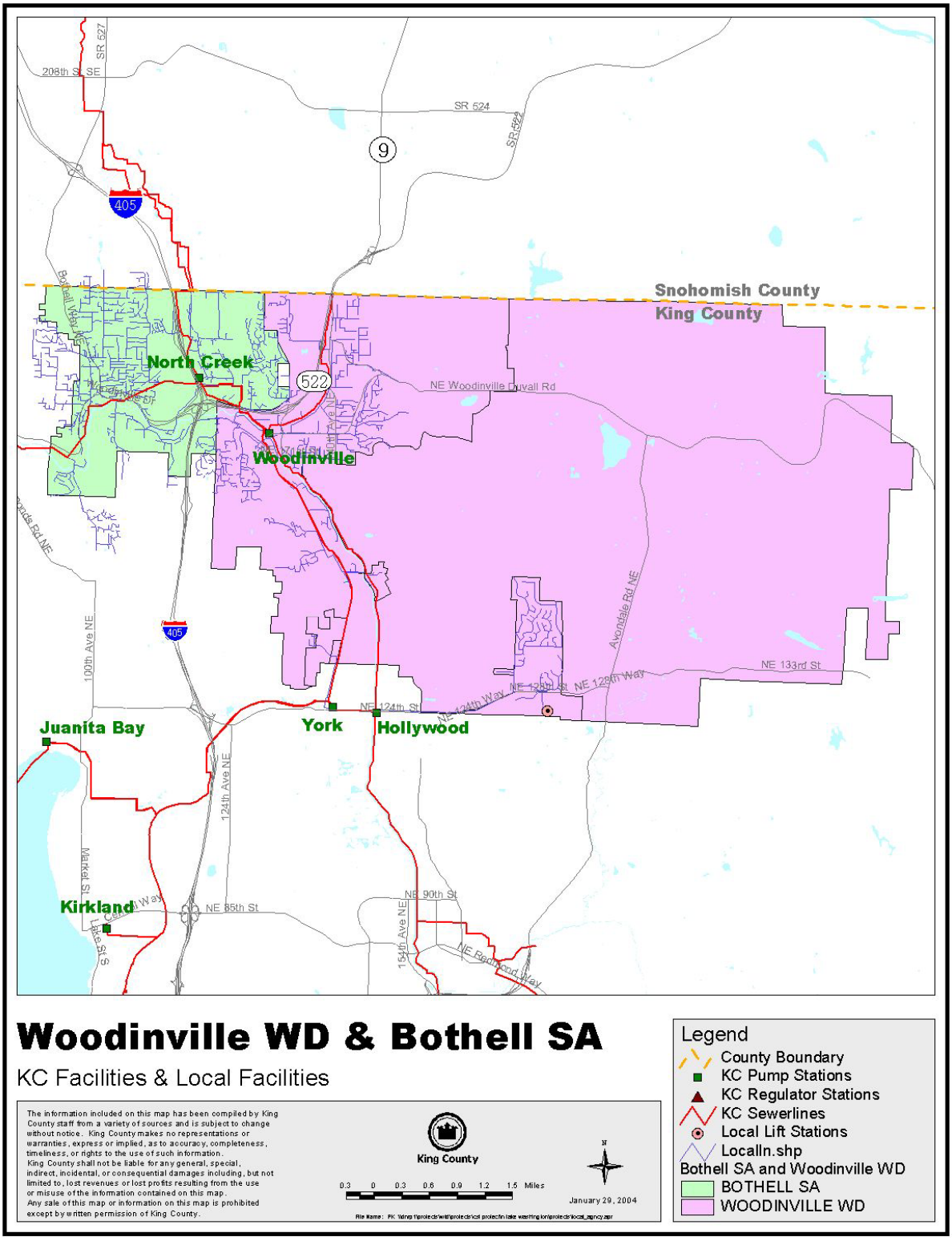

Figure 220-22. Woodinville Water District and the City of Brier Service Areas

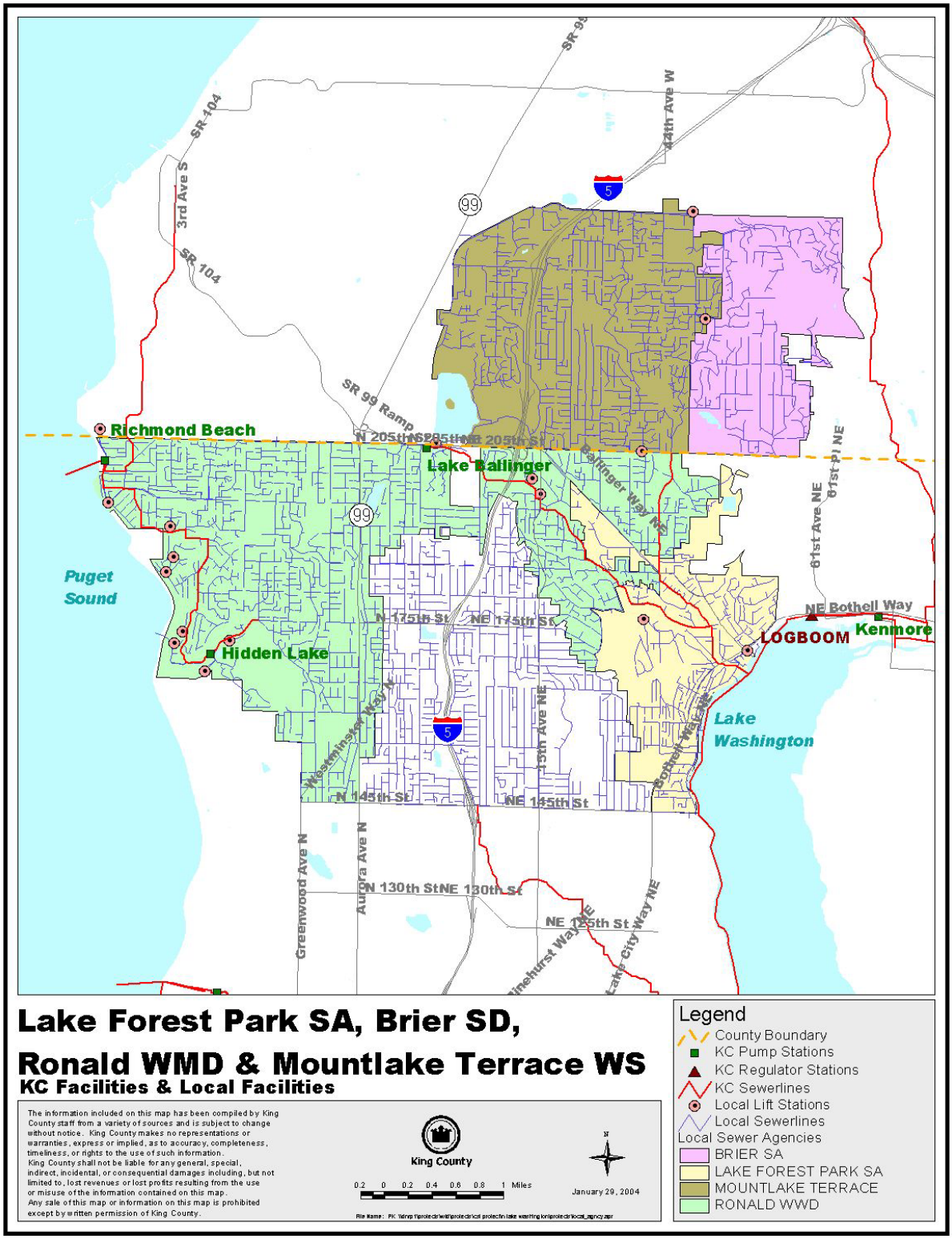

Figure 220-23. City of Lake Forest Park, City of Brier, Ronald Wastewater District, and City of Mountlake Terrace Service Areas

CITY OF LAKE FOREST PARK

The 1999 service area boundary of LFP is shown in Figure 220-23. In January 2003, LFP acquired the Ronald service area that was within the LFP city boundaries. With the acquisition, LFP currently has an estimated 55 miles of 6-inch to 15-inch gravity sewer pipes and approximately 2 miles of pressure sewer mains. The city also has four lift stations, one constructed by LFP, one acquired from SPU sometime between 1999 and 2003, and two acquired from the Ronald at the beginning of 2003. The largest of these four stations has a capacity of 440 gpm (0.6 mgd). All four are located in the County's McAleer & Lyon Service Basin.

The 1999 *City of Lake Forest Park Comprehensive Sewer Plan* also states that the LFP service area also has 300 properties that currently have on-site septic systems. Many of these properties are located near an existing sewer but have not yet connected to the system due to cost. Many of these properties are listed in the LFP sewer plan CIP for future connections.

RONALD WASTEWATER DISTRICT

With the service area transfer to LFP, the only portion of Ronald within the North Lake Washington Planning Area is located within the County's Lake Ballinger – King Service Basin. Ronald has one 50-gpm lift station in this area. The 1990 *Shoreline Wastewater Management District Comprehensive Sewer Plan* did not specifically list the length and diameter of sewer pipes in this area (the Shoreline Wastewater Management District is the former name of Ronald).

Ronald has an agreement with MLT regarding two connections in the planning area. Ronald receives flows from one area of MLT through the first connection while flows from another a neighborhood within Ronald is conveyed to MLT at the second location. Ronald has also entered in an agreement with LFP regarding the operation and maintenance of the newly acquired LFP facilities.

The district considers the area within the Lake Ballinger – King Service Area to be built-out. All of the capital improvements scheduled for this area are related to the replacement of sewer pipes in poor condition, I/I control, and the reconstruction of the one lift station.

CITY OF MOUNTLAKE TERRACE

Some areas of the MLT system have been previously described in the interlocal agreements with Brier and Ronald. The majority of the MLT service area is located within the Lake Ballinger – Snohomish Service Basin. The Edmonds Flow Transfer Agreement between Edmonds and King County governs flows generated in this area. No further discussion is required for this system.

OLYMPIC VIEW WATER AND WASTEWATER DISTRICT AND CITY OF EDMONDS

Portions of the Olympic View and Edmonds service areas are located with the Lake Ballinger – Snohomish Service Area and flow into the Lake Ballinger Pump Station. As mentioned in the pump station discussion, their respective interlocal agreements with Edmonds and then the Edmond Flow Transfer Agreement between Edmonds and the County govern flows from these agencies. No further discussion is required for these two agencies.

NORTHSHORE UTILITY DISTRICT

The Northshore system consists of twelve lift stations, four grinder pump stations, and 216 miles of gravity sewer pipes with diameters ranging from 8-inches to 30-inches. Six of the lift stations and none of the grinder pump stations are located in the North Lake Washington Planning Area. The length of Northshore pipes located in this planning area could not be determined. The boundaries of the Northshore service area are show in Figure 220-24.

Part of the Northshore service boundary lies within Bothell. However, Bothell provides all sewer service within its city limits. Northshore has an agreement with LFP to provide wastewater service to approximately 180 connections located inside the LFP city limits but outside the LFP service boundary. The district also has an agreement with Woodinville to receive flows from approximately 170 connections located within the Woodinville service area. Northshore has two agreements with Alderwood. These agreements have been described in the section regarding the Alderwood and Brier systems.

Aside from the previously mentioned Swamp Creek Trunk Extension, the only work outlined in the *2000 Northshore Utility District Wastewater Comprehensive Plan – Volume 1: System Analysis and Capital Improvements* through 2020 that is applicable to the North Lake Washington Planning Area is the reconstruction of aging pump stations and the replacement of under- and over-sized pipelines.

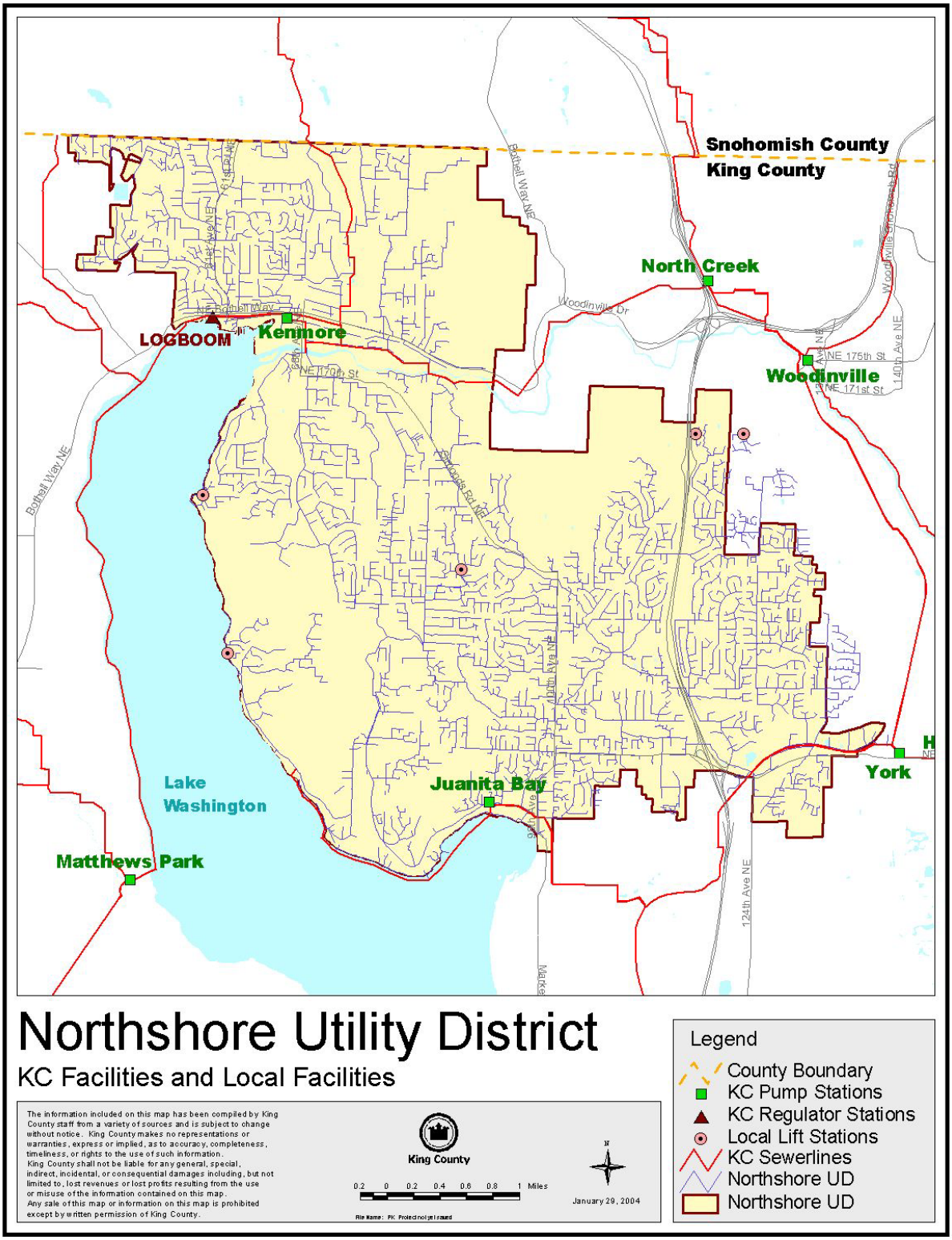

Figure 220-24. Northshore Utility District Service Area

SILVER LAKE WATER DISTRICT

As previously mentioned in the Alderwood section, the Silver Lake service area is located north of Alderwood and straddles the northern boundary of King County's and Alderwood's respective North Creek service basins. The district operates 14 lift stations, ranging from 100 gpm to 1,700 gpm in capacity, and has approximately 6 miles of forcemains and 125 miles of 6 – 18-inch diameter gravity sewer lines.

The majority of the wastewater generated in the Silver Lake drains northward towards the City of Everett's conveyance system for treatment at the City of Everett plant. The 1996 flow transfer agreement with Alderwood allows Silver Lake to direct flows from the southwestern and southern portions of the district's service area to the Alderwood conveyance system for ultimate treatment by King County. The agreement includes provisions barring Silver Lake from surcharging the Alderwood conveyance system.

Only a portion of the southwestern area, designated by Alderwood as the Silver Lake Tributary Area, currently generates wastewater that eventually enters County facilities. The 1,314-acre Silver Lake Tributary Area is located in the King County North Creek – Snohomish Service Basins and the Mill Creek UGA. Approximately half of the area does not have wastewater collection and conveyance facilities. Of the remaining area, there is one lift station that pumps a portion of the wastewater north for treatment at Everett's plant. The lift station, the 350 gpm Mill Creek Gateway Lift Station, is planned for removal through developer extensions. Proposed improvements will allow the wastewater collected by the eliminated lift station to flow south to the North Creek Trunk. No date was listed in the *Silver Lake Water District Wastewater Comprehensive Plan Update* (1998) for when the lift station will be decommissioned.

The Silver Lake South Undeveloped Area (the Alderwood designation for the Silver Lake southern transfer area) and the adjacent Unclaimed Service Area (which has since been annexed by Silver Lake) has no public sewer service. The majority of these two areas are located in the North Creek – Snohomish Service Basin and the Snohomish County UGA, with the remainder located in the Bear Creek – Snohomish Service Basin and outside the Snohomish County UGA. Under the 1996 *Interlocal Agreement Between Snohomish County, Cross Valley Water District and Alderwood Water District Concerning the Provision of Sewer Service to Portions of the Bear Creek Basin*, Alderwood would only consider providing sewer services to the 397-acre portion of the Silver Lake South Undeveloped Area within the Alderwood North Creek Service Basin.

Silver Lake is currently working on a developer financed lift station to be built at the Silver Lake-Alderwood service area boundary to provide wastewater service to a new residential development being constructed in the Silver Lake South Undeveloped and Unclaimed Service Areas. The new 164th Street Lift Station would collect wastewater generated in the southern portion of the Unclaimed Area and pump it to Alderwood's Olympus Meadows Trunk and the King County North Creek Interceptor via a 1,700 LF 10-inch diameter ductile iron forcemain. The northern portion of the area is being sent to the City of Everett system for treatment.

SERVICE BASINS

The North Lake Washington Planning Area includes sixteen King County Service Basins in four Service Areas. These service areas and basins includes:

Kenmore – King County Service Area

- Kenmore Section 5 Service Basin
- Inglewood Service Basin
- Bothell Service Basin
- Swamp Creek – King County Service Basin
- North Creek – King Service Basin
- Bear Creek – King Service Basin,
- Woodinville Service Basin
- East Woodinville Service Basin

Kenmore – Snohomish County Service Area

- Swamp Creek – Snohomish County Service Basin
- North Creek – Snohomish County Service Basin
- Cross Valley Service Basin
- Lake Forest – Snohomish Service Basin
- Lyon Service Basin

Metro West Service Area

- Lake Forest Service Basin
- McAleer & Lyon Service Basin

Snohomish – Non-King County

- Lake Ballinger – Snohomish Service Basin

Eighty-three percent of the total sewered area and 80 percent the total sewered population in the North Lake Washington area is located in Snohomish County. Table 220-10 lists the individual sewered areas and populations of the service basins in the area.

Table 220-10. North Lake Washington Planning Area Service Basin Descriptions

Service Basin	Sewered Area (acres)	2000 Populations			
		RES	COM	IND	TOT
Lake Forest	1,294	7,722	2,021	67	9,810
McAleer & Lyon	2,085	14,333	4,066	56	18,453
Cross Valley	8,614	0	1,706	1,035	2,741
North Creek – Snohomish	16,329	42,249	8,858	5,072	56,178
Swamp Creek – Snohomish	7,929	25,461	8,369	2,889	36,718
Lake Forest – Snohomish	946	4,790	505	209	5,505
Lyon	473	2,471	291	116	2,878
Swamp Creek – King	718	3,520	832	76	4,428
Bothell	2,252	10,672	4,519	816	16,007
Kenmore Section 5	1,327	3,750	1,129	118	4,996
North Creek – King	1,084	3,382	1,957	330	5,670
Bear Creek – King	1,466	5,296	3,062	753	9,111
East Woodinville	870	1,398	1,963	506	3,867
Woodinville	1,085	2,872	782	205	3,859
Inglewood	1,250	6,339	1,437	125	7,901
Lake Ballinger – Snohomish	4,128	31,915	8,837	462	41,214
Total North Lake Washington Planning Area	51,850	166,170	50,334	12,835	229,336

Abbreviations:
RES: sewered residential COM: commercial IND: industrial TOT: total population serviced

Source: Brightwater Regional Wastewater Treatment System Facilities Plan (Preliminary Working Draft), 2003.

REFERENCES

CH2M Hill. Woodinville Water District Comprehensive Sewer Plan. April 1993.

Gardner Consultants, Inc. City of Bothell Sanitary Sewer System Plan. January 1993.

Garry Struthers Associates, Inc. Swamp Creek Planning Study: Final Report. January 1999.

Gray & Osborne, Inc. Northshore Utility District Wastewater Comprehensive Plan – Volume 1: System Analysis and Capital Improvements. December 2000.

Gray & Osborne, Inc. Silver Lake Water District Wastewater Comprehensive Plan Update. May 1998.

Hammond Collier Wade Livingston. Draft City of Brier Comprehensive Sewer Plan. December 2000.

HDR Engineering, Inc. Alderwood Water & Wastewater Sanitary Sewer Comprehensive Plan: Volumes 1 and 2. July 2000.

HDR Engineering, Inc. Kenmore Interceptor and North Creek Storage Analysis. July 2000.

HDR Engineering, Inc. Wastewater 2020 Plus Existing Conditions. August 1994.

King County Department of Natural Resources. Regional Wastewater Services Plan: Operational Master Plan. December 1999.

King County. Brightwater Regional Wastewater Treatment System Facilities Plan (Preliminary Working Draft). May 2003.

Municipality of Metropolitan Seattle Water Pollution Control Department. Offsites Facilities and Miscellaneous Structures Manual: Volume 2, West Division, Revision B. April 1993.

S T Engineering. Cross Valley Water District Sewer System Comprehensive Plan. October 1994.

Snohomish County, Cross Valley Water District, and Alderwood Water District. *Interlocal Agreement Between Snohomish County, Cross Valley Water District and Alderwood Water District Concerning the Provision of Sewer Service to Portions of the Bear Creek Basin*. January 1996.

TetraTech/KCM. North Creek Storage Facility Predesign Report. October 2000.